EVALUATION OF THE DISTANCE EDUCATION LITERATURE: A CONTENT ANALYSIS USING THE INSTITUTE FOR HIGHER EDUCATION POLICY BENCHMARKS AND SELECTED BIBLIOMETRIC METHODS

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CHAPTER 1

Introduction

Technology has influenced dramatic changes within the higher education learning environment. The personal computer and the Internet have the ability to remove the boundaries of geography and time as students are permitted to enter the educational experience continuum from enrolling in individual courses to completing full degree programs. Faculty respond to administrative pressure or their self-passion for technology to provide more courses online. Institutions of higher education publicize the advantages distance education courses and online degree programs have over traditional settings. The rush to provide Internet-based education continues at warp speed as a global society searches for alternatives to physically attending on-campus programs.

The beginning of online education research found practitioners comparing the benefits of online experiences with traditional classroom education. The quality of online education in comparison to traditional classroom education was and continues to be questioned. Reports of students obtaining "diploma mill" degrees from non-accredited institutions added to the negative perception of the quality and appropriateness of online programs. Numerous studies have been conducted to determine that no-significant difference occurred between the student outcomes of online and of traditional classroom courses (Twigg, 2001). Researchers continue conducting comparison studies between the online and classroom modes of instruction and attempting to ascertain the acceptability of

online degrees by employers. However, many researchers have "moved beyond no significant difference" to discuss those factors which contributed to quality in Internet-based distance education (Twigg, 2001, 2003).

Like the rapid growth of distance education courses and degree programs, scholarly research of distance education has grown at a similar swift pace. If the goal of researchers is to produce new knowledge, and we assume new knowledge to be built on the foundation of existing knowledge, then researchers must employ rigorous methods to analyze and synthesize the current literature and be more prudent in their acceptance of past literature. Judging sources of information takes on new importance in the Internet-age as modern telecommunications enables an information explosion for both author and reader. Authors may publish literature of questionable validity and reliability and readers can be overwhelmed with the amount of literature presented through online libraries, search engines, databases, and other online tools.

The focus of this study was to examine the distance education literature as it relates to the quality of online programs. Content analysis of the literature and the use of bibliometric methods to analyze the voice of research were the mechanisms to adjust the clarity of the study's focus and provide integrity to the findings. A secondary goal of this research is that the study will provide researchers and practitioners with a thorough understanding of the currently available literature, sources of literature, and authors contributing to the scholarly discussion of distance education. The existing literature can provide current researchers the evidence to generate new knowledge by providing a knowledge of emerging theories, validity and reliability data for supporting generalizations, cause and effect relationships, and identification of the variables and

factors contributing to the construct to be studied (Hall, Tickle-Degnen, Rosenthal, & Mosteller, 1994). Future research and practice in distance education must be framed on the foundation of the existing literature to substantiate the claims of new knowledge gained in distance education programs.

Background

Bonk and Dennen (2003) identified benchmarks and best practices as an important factor for higher education administrators to consider in the planning and decision-making process for developing a distance education framework. Benchmarks are performance indicators or best practices that may serve as standards or guiding principles for improving an organization's mission (Payne & Whitfield, 1999; Tucker, Zivian, & Camp, 1987; Wan Endut, Abdullah, & Husain, 2000). Benchmarks, in the context of higher education, provide colleges and universities with an opportunity to improve the quality of their operations by comparing performance information from other colleges and universities to their own (Ellis & Moore, 2006). Benchmarking also enables higher education institutions to compare and analyze performance indicators, identify best practices, and adopt in-part or in-total, specific program elements which would improve the quality of the institution's mission (Amin & Amin, 2003; Kirby & Waugaman, 2002; Payne & Whitfield, 1999).

A literature-based set of benchmarks provides a framework for all stakeholders to use to improve the quality of Internet-based distance education. Moore (2003a) stressed the need for an increased research focus in distance education by higher education in his remarks in the following way:

> Just as it is hard to imagine that in any other field of inquiry researchers could set out to gather data without full knowledge of what research had previously been undertaken, so it is hard to imagine other professionals would build programs, train teachers, invest millions of dollars, make appearances before Congressional committees, and soon, without a substantial review of previous practice in their field---without a review of what had succeeded and what had failed and the reasons for the successes and failures. Yet in distance education, it happens all the time. (p. xi)

A primary purpose of Moore's and Anderson's (2003) *Handbook of Distance Education* was to provide a comprehensive compilation of the literature as a reference for other educational technology professionals in response to changes and developments in distance education. Moore's and Anderson's goal was to provide a review of distance education research to inform practice and research. A number of other studies have reviewed the distance education literature with the same purpose in mind (Anglin & Morrison, 2000; Berge & Mrozowski, 2001; Koble & Bunker, 1997; Lee, Driscoll, & Nelson, 2004; Rourke & Szabo, 2002).

The Institute for Higher Education Policy (IHEP) published two reports that have served as the key source documents for research regarding the quality of Internet-based distance education. The first report was published in April 1999 entitled, *What's the Difference? A Review of Contemporary Research on the Effectiveness of Distance Learning in Higher Education*. The 1999 IHEP report primarily identified gaps and shortcomings of research on the effectiveness of distance education. The IHEP continued the research begun with the 1999 IHEP report in a 2000 IHEP report entitled *Quality on*

the Line: Benchmarks for Success in Internet-based Distance Education. The 2000 IHEP report initially identified 45 benchmarks grouped within seven categories that could guide higher education stakeholders in improving the quality and effectiveness in providing Internet-based distance education (see Appendix A). The final analysis of the 2000 IHEP report resulted in 24 benchmarks that are considered to be the most important quality indicators for Internet-based distance education (see Appendix B).

Premise for the Study

Higher education policy makers and administrators, government officials, faculty, and students are all stakeholders who benefit from a research-based framework and best practice indicators that have a track record of success. The fiscal constraints confronted by most higher education policymakers and decision makers require funds be expended in an effective and efficient manner. Faculty members are faced with a number of challenges when transitioning from traditional face-to-face classroom environments to distance education alternatives (Bennett & Bennett, 2002; Bryant, Kahle, & Schafer, 2005; Irani & Telg, 2002; Livingston & Condie, 2006). Student opportunities to enroll in distance education courses or degree programs continue to multiply as institutions create new programs or expand existing programs (Sloan Consortium, 2003). Faculty and students may need to acquire a new set of skills for programs to be a successful in the distance education arena.

Distance education stakeholders are also concerned with maintaining national accreditation of institutions and of educational programs. The purpose here is not to enumerate the accreditation system in the United States for higher education. Rather, the focus here is to relate the IHEP benchmarks to accreditation standards to further validate

the IHEP benchmarks as standards for Internet-based distance education. The topic of accreditation for distance education continues to evolve, and the ability of higher education to satisfy accreditation requirements will be an important factor contributing to the success of Internet-based programs (Belanich, Wisher, & Orvis, 2004; Benson, 2003; Bryant et al., 2005; Hanlon, 2004; Lezberg, 2003; Sherry, 2003; Stella & Gnanam, 2004; Vincent & Ross, 2002). The tension between accreditation organizations and academic freedom on the part of faculty may reach the flash point as more stringent accreditation standards are adopted (Buck, 2001; Weinstein, 2006). The pressure to establish more prescriptive accrediting standards increases as the acceptability of online degrees comes into question (Adams & DeFleur, 2005; Buck, 2001) and the issues associated with "diploma mills" and non-accredited institutions offering online degrees receives more and more public and governmental scrutiny (Loane, 2001; LoPez-Rivera, 2006; Woods, 2006).

Higher education's use of Internet-based distance education continues to expand at a high rate. The 2000 IHEP report identified approximately 1.6 million students were enrolled in distance education courses during 1997-1998 according to a survey conducted by the U.S. Department of Education's National Center for Education Statistics (NCES). The NCES (2003) also found that 3.077 million students were enrolled in distance education courses at postsecondary institutions. The variety technologies employed by higher education is also increasing. The NCES (1997) reported 14% of postsecondary institutions during 1995 offered two-way online interactive courses using Internet-based technology. The NCES (1997) reported no statistics for asynchronous or synchronous Internet course categories. The 2003 NCES reported 90 % of postsecondary institutions

during 2000-2001 offered distance education courses using Internet-based technology in an asynchronous mode of instruction and 43 % of institutions reported use of synchronous Internet-based courses.

The 1999 IHEP's (p.1) finding that "colleges and universities are forging ahead to provide learning at a distance, and many institutions are making substantial investments in new technologies for teaching" has a prophetic ring not envisioned by most institutions at the time of the 1999 IHEP report. The Accrediting Commission of the Distance Education and Training Council (DETC) in 2004 estimated five million distance education students and over 4,000 institutions offering distance education. Postsecondary institutions have considerably more experience with providing Internet-based distance education than they did in the 1990's or even in the early part of the 21st century.

The IHEP (2000) as well as several other researchers (Bonk & Dennen, 2003; Compora, 2003; Sherry; 2003, Stella & Gnanam, 2004) identified the need for further study of distance education benchmarks and guidelines. Various studies have examined benchmarks as a strategy for determining quality in distance education (Ellis & Moore, 2006; Novak, 2002; Parry & Dunn, 2000; Prestera & Moller, 2001). Continued research may facilitate the link between theory and practice and provide new criteria for improving or evaluating distance education programs. A main purpose of the 2000 IHEP report was to provide a foundation for future research and analysis. The framework set forth by the 2000 IHEP report provides a rich opportunity for evaluating Internet-based distance education benchmarks, researching a particular benchmark category or benchmark in isolation, or researching particular benchmarks in combination with other benchmarks.

Statement of the Problem

Advances in technology and telecommunications, pedagogical research, instructional design, political and economic pressure, and responding to student needs are various factors that have contributed to a rapidly changing environment for Internet-based distance education. Higher education is expending significant resources to take advantage of technology to provide online education options to students and to meet the demands of a global enterprise. The use of technology has the potential to greatly enhance the post-secondary institutional environment and expand learning opportunities for students, while at the same time, technology presents challenges that could have a negative impact on the quality of distance education programs if not dealt with responsibly through well-informed decision making based on high-quality research.

The rush to adopt new technology must be tempered by the human factor and reinforced by a commitment to quality in distance education. Barron (2003) interpreted Naisbitt's (1999) concept of *High Tech*, *High Touch* as, "with every introduction of new technology, there must also be a counterbalance of human interaction or the technology will be rejected" (p. 25). High drop out rates (Chyung, 2001; Dupin-Bryant, 2004; Eastman & Swift, 2001), resistance to distance education (Moore & Kearsley, 2005; Stella & Gnanam, 2004), increased enrollments (Saba, 2005; Sloan Consortium, 2003; Stella & Gnanam, 2004) and the need for new continued improvement in instructional design and pedagogy (Bryant et al., 2005) are a few of the issues challenging the "humanness" and quality of distance technology.

Constant change demands continued research concerning ways to maintain quality programs and keep pace with Novak's (2002) prediction, "…that distance

education is an evolving medium and that what we are calling distance education today will probably be unrecognizable ten years from now" (p. 80). Internet-based distance education has changed substantially and the body of literature has expanded significantly since the 2000 IHEP report *Quality on the Line: Benchmarks for Success in Internet-based Distance Education*. The gaps and inadequacies in the research identified by the IHEP (1999, 2000) and Moore (2003a) became the primary influences that convinced this author there was a need to conduct a comprehensive study of the current body of published research in distance education.

Previous studies have stated distance education research lacks a theoretical perspective and have questioned the quality of distance education research and practice. Moore (2003a) agreed with the 1999 IHEP assertion that distance education research generally lacks a theoretical framework. A paradoxical situation appears to exist given that the 2000 IHEP benchmarks provided the components that serve as the basis for determining quality in distance education theory and practice. There is a need to know whether researchers continued to contribute to the knowledge and practice of maintaining quality in distance education within the framework of the established IHEP benchmarks.

Purpose of the Study

The primary purpose of this study was to determine what 2000 IHEP benchmarks were found in the recent distance education literature for the time period 2002 through 2006. A secondary purpose of this study was to identify the publications, authors, patterns, and relationships among those publications that contributed to the current body of research in distance education. First, a content analysis identified the IHEP

benchmarks that were found in the recent distance education literature. Then, bibliometric methods were used to analyze the patterns and relationships existing in the distance education literature among the associated bibliographic data.

Research Questions

General question:

To what extent have the IHEP benchmarks from 2000 guided recent distance education research, what relationships among the research publications did the bibliometric methods identify, and how did the results improve distance education research?

Specific questions:

The following questions guided the content analysis component of the study:

1. Which IHEP benchmarks were reiterated in the research literature and at what frequency?
2. What new benchmarks were identified in the research literature?

The following questions guided the bibliometrics component of the study:

1. Which citing authors were the primary contributors to the research?
2. Which authors received the highest frequency of citations?
3. What type of organizational affiliations do the citing authors represent?
4. What research methods were reflected in the literature?
5. What benchmark category and research methodology differences were found between the four journals which comprised the citing references?
6. What journal publications were cited with the highest frequency?

7. What journal article titles were cited with the highest frequency?
8. What book titles were cited with the highest frequency?
9. What type of publication was cited with the highest frequency?
10. What bibliographic coupling relationships or patterns exist among the literature?
11. What co-citation analysis relationships or patterns exist among the literature?

Theoretical Framework

The IHEP (1999) stated, "Several authors have lamented that there are no theories that deal with the interactions and interrelationships of variables in terms of the effectiveness of distance learning programs" (p. 27). Moore's and Kearsley's (2005) systems model provides a theoretical framework for applying the 2000 IHEP benchmarks as the components of a distance education system which contribute to quality in Internet-based distance education. Overall quality in the systems model context is lowered if one or more of the final 24 2000 IHEP benchmarks are not present in the total distance education program (IHEP, 2000). Each component of the system has an effect on the quality of the total system. For example, poor quality in student support may have a negative impact on student learning. Low quality in faculty professional development could result in poor instructional design by faculty developing courses. The 2000 IHEP benchmarks equate to the components/subsystems of Moore's and Kearsley's systems model for quality in distance education. The study of individual benchmarks or components has merit; however, there should be a balance reflected in the research by

taking a holistic approach to the study of distance education using the systems model (Moore & Kearsley, 2005).

Significance of the Study

This study provides higher education faculty and instructional technology researchers with an evaluation of the recent research in Internet-based distance education since the IHEP studies were published in 1999 and 2000. The uniqueness of this study comes from applying the 2000 IHEP benchmarks as the conceptual model for the literature evaluation in the context of a systems model framework.

The rapid proliferation of Internet-based programs and technology has created a challenging situation for higher education and accrediting organizations. Evaluating the quality of Internet-based distance education can be problematic without standards and metrics. Metrics are the methods used to measure the performance of distance education courses or programs in satisfying standards of quality. Rubrics are one method of evaluating the performance of online programs to meet quality standards. The challenge of evaluating Internet-based distance education was stated by Thompson and Irele (2003), "It is important to realize that, without referents, the terms *quality* and *effectiveness* are meaningless" (p. 571). Higher education must implement standards to conduct quality Internet-based distance education programs and accrediting organizations must utilize a system of standards to properly conduct evaluations of higher education programs.

Evaluation of the results of distance education research will provide higher education stakeholders a valuable resource in their decision-making and problem-solving processes. The study will also provide researchers a guide for future research to study the limitations identified by Moore (2003a) and the IHEP (1999, 2000).

Definitions and Terms

Accreditation: “Accreditation is a process of external quality review used by higher education to scrutinize colleges, universities and educational programs for quality assurance and quality improvement. In the U.S., accreditation is carried out by private, nonprofit organizations designed for this specific purpose” (Council for Higher Education Accreditation, 2003).

Affiliation: “The organization or place of business with which an author is associated” (Diodato, 1994, p.3).

Autocitation: “A citation for which an individual is an author of both the citing document and the cited document” (Diodato, 1994, p.3).

Benchmark: “the term ‘benchmark’ is used to describe the array of principles, strategies, and guidelines that have been recommended by the many organizations concerned with quality distance education. In general, a benchmark is an institutional behavior that contributes to ensuring quality in technology-mediated distance education” (IHEP, 2000, p. 5).

Bibliographic coupling: The method of bibliographic coupling indicates a relationship between two citing documents that have common citations. “The situation in which two documents each have citations to one or more of the same publications” (Diodato, 1994, p. 12).

Bibliographic data: “The author, title, place of publication, and other such information about a document” (Diodato, 1994, p. 13).

Bibliometrics: The application of measurements and statistics to study the bibliographic data of documents and publications. Citation analysis, bibliographic coupling, and co-citation are examples of bibliometric methods.

Citation: "When document A is mentioned in document B, the mention is a citation. The mention may occur in the text of document B or in the endnotes, footnotes, bibliography, or reference list of document B" (Diodato, 1994, p. 32).

Citation age: "The citation age between a document and one of the references that cites is obtained by subtracting the publication date of the reference from the publication date of the citing document" (Diodato, 1994, p. 33).

Citation analysis: "Comprises a variety of ways to analyze references cited in scholarly publications" (Moed, 2005, p.20). Various studies use citation analysis to determine the frequency of bibliographic data. "Such studies may focus on the documents themselves or on such matters as: their authors, the journals (if the documents are journal articles) in which the articles appear; the organizations or countries in which the documents are produced; the purpose of the citations" (Diodato, 1994, p.33).

Cited document and citing document: "If document A cites document B, then document A is the **citing** document and document B is the **cited** document" (Diodato, 1994, p. 41). Normally, the cited document with be found in the reference list of the cited document.

Co-citation: Cited documents are related because they are cited by the same citing document even if they don't cite each other. "The situation in which two (or more) authors, documents, or journals are simultaneously cited by another document" (Diodato, 1994, p. 42).

Distance education: “all forms of education in which all or most of the teaching is conducted in a different space than the learning, with the effect that all or most of the communication between teachers and learners is through a communications technology” (Moore, 2003b, p. xiv). Various individuals and communities use the terms distance education and distance learning synonymously. This study followed Moore and Kearsley’s (2005) distinction that distance education includes teaching and learning. Distance learning focuses on the learner. For this study, the focus of distance education related to the use of Internet technologies.

Higher education: The Northwest Commission on Colleges and Universities (2003) defines higher education as “Postsecondary education emphasizing degrees and credentials rather than training limited to skill development within a specific trade” (p. 168). The IHEP (2005) also connected higher education with postsecondary education, “The mission of the Institute for Higher Education Policy is to foster access and success in postsecondary education through public policy research and other activities that inform and influence the policymaking process” (para. 1). The National Center for Education Statistics (2005) defined postsecondary education as:

> The provision of a formal instructional program whose curriculum is designed primarily for students who are beyond the compulsory age for high school. This includes programs whose purpose is academic, vocational, and continuing professional education, and excludes avocational and adult basic education programs. (p. 53)

Therefore, this study defined institutions of higher education synonymously with postsecondary institutions using the National Center for Education Statistics definition.

Internet: “a worldwide network of computer networks. It is an interconnection of large and small networks around the globe” (Moore & Kearsley, 2005).

Internet-based distance education: Distance education using the Internet as the primary means of communication.

Institute for Higher Education Policy (IHEP) benchmarks: Henceforth, the term IHEP benchmark refers to those benchmarks found in the 2000 IHEP report, *Quality on the Line: Benchmarks for Success in Internet-based Distance Education.*

Obsolescence: “The decrease in use of a document or group of documents as the documents become older” (Diodato, 1994, p. 119).

Online environment: For this study, online is defined as being connected to the Internet.

Primary author: “Usually the author listed first on the title page of a document. If the document has only one author, then the author is considered the primary author” (Diodato, 1994, p. 5).

Quality: “Refers to ‘fitness for purpose’—meeting or conforming to generally accepted standards as defined by an accrediting or quality assurance body” (Council for Higher Education Accreditation, International Quality Review, Glossary, 2001). The 2000 IHEP benchmarks are one set of standards that list the characteristics defining a quality program. The more characteristics found in a program would produce higher quality programs dependent upon the degree and magnitude of quality in the characteristics.

Secondary author: “Any author other than the primary one. Usually this means any author listed as the second, third, or subsequent name on the title page of the document” (Diodato, 1994, p. 6).

Self citation: “Usually a citation for which an individual is an author of both the cited document and citing document” (Diodato, 1994, p. 148).

Standards: “The level of requirements and conditions that must be met by institutions or programs to be accredited or certified by a quality assurance or accrediting agency” (Council for Higher Education Accreditation, International Quality Review, Glossary, 2001).

Success: The accomplishment or attainment of a specific goal or desired purpose. Success is a highly subjective and contextual concept based on the perspective and role of the individual, group, or institution defining success. For example, an institution may consider a distance education program successful based on achieving student enrollment goals. The IHEP considered a distance education program to be successful when all 24 benchmarks are present in the program.

Assumptions

The boundaries for the scope of this research study are the seven benchmark categories and the original 45 benchmarks identified by the 2000 IHEP. The 2000 IHEP benchmarks will serve as the thematic categories for coding purposes during the content analysis of the literature. The benchmarks are not provided as an absolute prescription for all higher education institutions, but are offered as a guide for promoting quality in

Internet-based distance education programs or coursework and to stimulate interest in further research.

The scope of the literature evaluation will be confined to research reported from 2002 to 2006 (with country of publisher) in *The American Journal of Distance Education* (US), the *Journal of Distance Education* (Canada), *Open Learning* (UK), and *Distance Education* (Australia). Moore and Kearsley (2005) identified these four journals as "the four principal distance education journals" (p. 237) and other scholars have used the four journals as the basis their distance education literature evaluations (Berge & Mrozowski, 2001; Lee et al., 2004). Koble and Bunker (1997) studied research trends found in *The American Journal of Distance Education* from 1987-1995, while Rourke and Szabo (2002) analyzed the *Journal of Distance Education* from 1986-2001. Editorials, book reviews, interviews, and commentaries found in the journals will not be included in the evaluation. The four journals to be evaluated are all peer-reviewed.

Limitations

The study did not provide an independent review of coding the literature according to the 2000 IHEP benchmark categories. The possibility does exist that other reviewers might classify an article differently during the content analysis coding. The same limitation may exist for coding the article's methodology, author affiliation, or publication type. However, the author coded all the required information for the study and the data were recorded in a database, which provided consistency and integrity for data element definitions. Errors in data collection and data base entry required continual scrutiny by the author (Moed, 2005).

There are potential limitations and biases associated with bibliometric methods. The quality or scholarliness of publications and decision-making or policy actions based solely on citation counts are potential issues of concern as identified in the literature (Borgman, 1990; Holden, Rosenberg, & Barker, 2005; Klein & Bloom, 2005; Moed, 2005). There are concerns with regards to the peer review process related to potential bias on the part of reviewers (Ligon & Thyer, 2005; Moed, 2005). The four journals reviewed for this study are all peer reviewed, which in the aggregate should provide higher quality of scholarly communication than non-peer reviewed publications.

The length of time for the peer review process, acceptance of articles, and actual publication may impact the results of bibliometric data (Klein & Bloom, 2005; Ligon & Thyer, 2005). Actual publication may take one to two years from initial submission of the research study and this does not take into account the time taken for the researcher to actually conduct the study and write the research article. Once published, there is an additional time lag for the document to possibly be cited by another document. Borgman (1990) stated this limitation: "Because of normal lags in publication cycles, it often takes at least two years for one published work to be cited by another" (p. 100). This could be an important factor for Internet-based distance education considering the rapid changes occurring in the discipline.

Errors found in the reference lists impact the reliability and accuracy of the data. Moed (2005) identified misspellings, incorrect volume numbers, and different versions of an author's name affecting the accuracy of citation data. The use of electronic versions of documents created accuracy issues when the uniform resource locator (URL) for the

document was no longer valid. Many of these accuracy problems were overcome by reviewing the primary source of the citation.

The decision to evaluate *The American Journal of Distance Education, the Journal* of *Distance Education*, *Open Learning*, and *Distance Education* may cause concern since there are additional publications and reports in fields such as educational technology, computer science, and library and information science, to name a few. However, the bibliometrics methodology identified the primary citation sources found in the reference lists of the four journals. Future research could apply content analysis to these primary citation sources using the IHEP benchmarks as thematic categories.

Organization of Study

This study is organized in a five-chapter format. Chapter I presented a topical background, problem to be studied, purpose of the study, significance of the study, research questions, delimitations, and limitations. Chapter I also presented the theoretical framework and concise identification of the methods for the study. Chapter II discusses the previous literature related to quality and accreditation in Internet-based distance education, systems approach, bibliometrics, previous evaluations of the distance education literature, and synthesis of relevant findings. Content analysis and bibliometric methods will be discussed in Chapter III. Chapter III will also explain the design and development of a data base to conduct the data collection. Chapter IV will analyze the data collected and present the study's results. Chapter V presents a summary of the study, interpretations, implications, recommendations, and conclusions.

CHAPTER II

REVIEW OF LITERATURE

Introduction

The purpose of this study was to evaluate the distance education literature to discover if researchers are continuing to study the Institute for Higher Education Policy (IHEP, 2000) benchmarks for quality in Internet-based distance education. An important aspect of this study was to examine the research literature within the field of distance education to determine the authors, publications, and citation relationships that were the principal contributors to distance education research. Content analysis and bibliometric methods were utilized to achieve this study's purpose.

Research in benchmarks and best practices should provide knowledge and information to guide distance education stakeholders and assist them in designing, developing, and implementing online programs. The risks are high for all involved who invest resources to provide technology-based education programs. Establishing and maintaining the resources necessary to provide distance education courses and programs are a major challenge for higher education institutions (IHEP, 1999). The need exists to ensure that institutions investing in technology and distance education programs meet the needs of faculty, students, and the requirements of accrediting organizations. The high costs associated with institutions providing technology infrastructure, faculty services,

and student support to satisfy these needs dictate the requirement to have benchmarks for quality in distance education. The IHEP benchmarks and the study of their application to distance education provide researchers and practitioners a roadmap to attain quality in distance education programs (Sherry, 2003). The purpose, research questions, and design of this study should provide a resource to inform practice and assist future research.

The research questions were designed to provide this study the structure to achieve its purpose and present the results based on the data collection and analysis. The research questions were organized according to the two methods employed in this study, content analysis and bibliometrics. Content analysis research questions analyzed the extent of the IHEP benchmarks within recent distance education literature. Bibliometric methods analyzed bibliographic data and citation patterns to determine the primary contributors to distance education research. Citation analysis, co-citation analysis, and bibliographic coupling were the bibliometric methods utilized.

The literature review consists of six main sections. The literature review begins with an overview of the 2000 IHEP study and the literature related to the benchmark categories and benchmarks. The second section will provide a discussion focused on further definition of quality in distance education within the framework of the IHEP benchmarks. The influence of accreditation on the quality of distance education and a brief comparison between accrediting guidelines and the IHEP benchmarks will constitute the third section. The fourth section will examine the framework of the systems model for distance education and how quality is dependent upon the relationship of the system and subsystems which, in the case of this study, are classified by the IHEP benchmark categories and benchmarks. The fifth section examines the previous research

that analyzed the distance education literature. The summary of the existing literature analyses provides the foundation for selecting the research studies to be evaluated and an indication of the citation factors to be analyzed in this study. Finally, a summary of relevant findings from this literature are presented.

IHEP Benchmark Categories and Benchmarks

Overview

What's the Difference? A Review of Contemporary Research on the Effectiveness of Distance Learning in Higher Education (IHEP, 1999) was sponsored by The National Education Association (NEA) and the American Federation of Teachers with the purpose of reviewing the research on the effectiveness of distance education. The intention of the report was to help higher education entities make informed judgments and decisions regarding distance education by providing administrators, faculty, and students a research-based framework in which to integrate technology in the education process and identify factors associated with effective distance education practices. The NEA and Blackboard Incorporated commissioned *Quality on the Line: Benchmarks for Success in Internet-based Distance Education* (IHEP, 2000) which identified 24 benchmarks grouped within seven categories that could guide higher education in improving the quality and effectiveness of providing Internet-based distance education.

Various organizations had promulgated benchmarks and quality standards for all modes of distance education prior to the 2000 IHEP report. The NEA and Blackboard Incorporated commissioned the 2000 IHEP report to validate the previous benchmarks published by various organizations and to specifically address their applicability to

Internet-based distance education in higher education. The goal of the 2000 IHEP report was to validate the benchmarks, determine the degree to which they are incorporated into higher education, and ascertain the importance placed on the benchmarks by faculty, students, and administrators. The benchmarks were applicable in the context of courses or complete degree programs offered in an online mode using the Internet.

The IHEP (2000) used a three-phased sequential case study process for conducting their research (see Figure 1). Phase one was a literature review, phase two was the selection of institutions to be studied, and the final phase consisted of on-site visits to the institutions selected in phase two for the purpose of data collection.

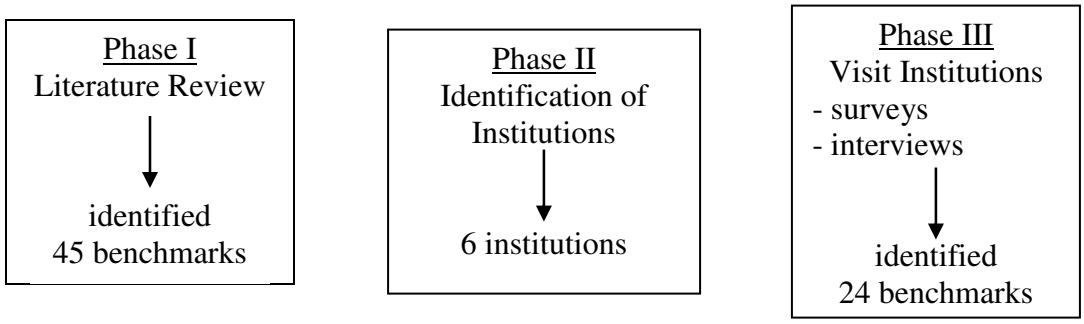


Figure 1. IHEP 2000 study: Three-phase sequential process

This study used the 2000 IHEP report definition of benchmark as a guideline to maintain a focus for the literature review and data collection activities:

> the term 'benchmark' is used to describe the array of principles, strategies, and guidelines that have been recommended by the many organizations concerned with quality distance education. In general, a benchmark is an institutional behavior that contributes to ensuring quality in technology-mediated distance education. (p. 5)

The institutional behaviors comprising the activities conducted by institutions for promoting quality in Internet-based distance education could be described as the characteristics and attributes found in an Internet-based distance education program. The more characteristics found in a program would produce higher quality programs dependent upon the degree and magnitude of quality assumed in those characteristics.

The initial literature review in the 2000 IHEP report identified 45 benchmarks for quality Internet-based distance education (See Appendix A). The benchmarks were grouped into the following seven categories: institutional support, course development, teaching and learning process, course structure, student support, faculty support, and evaluation and assessment. The IHEP did not rank the benchmarks by importance. The literature review included a review of standards recommended by the regional accrediting organizations for higher education such as the Middle States Commission on Higher Education. In phase two, six institutions considered by the IHEP to have extensive experience in delivering distance education programs were selected to participate in phase three of the study. The six institutions selected were: Brevard Community College, Regents College, University of Illinois at Urbana-Champaign, University of Maryland University College, Utah State University, and Weber State University. Phase three conducted at the six institutions consisted of quantitative surveys followed by qualitative interviews.

On the survey instrument the respondents rated the benchmarks according to two quality indicator criteria using a Likert Scale. First, respondents were asked whether the benchmark was present in their distance education program with a scale of (1) completely absent to (7) completely present. The second criteria was used to evaluate the importance

of the benchmark to the quality of the distance education program based on a scale of (1) not very important to (5) very important. The 45 benchmarks were reduced to 24 benchmarks based on the surveys and interviews conducted at the six postsecondary institutions. The listing of the 45 benchmarks by category (see Appendix A) was annotated to identify the IHEP decision to include or exclude the benchmark from the final list of 24 essential benchmarks. The final list of the essential 24 IHEP benchmarks included three new benchmarks, rephrasing or combining of some benchmarks, and reassignment of a few of the benchmarks to different categories (see Appendix B). The final 24 IHEP benchmarks were considered "essential for quality distance education" (2000, p. 23) and were not ranked in order of importance since the IHEP considered all 24 benchmarks to be critical to quality.

Related Studies - IHEP Benchmark Categories and Benchmarks

Several studies have included the work of the initial IHEP reports in their discussion of quality in distance education (Bennett & Bennett, 2002; Ellis & Moore, 2006; Gaide, 2005a; Novak, 2002; Stella & Gnanam, 2004; Yeung, 2001). All of the authors provided an overview of the benchmark categories to identify the topics that contribute to quality in distance education. Several of the authors connected the benchmarks with accreditation standards as similar in their indication of quality (Ellis & Moore, 2006; Novak, 2002; Stella & Gnanam, 2004). Yeung (2001) validated the IHEP (2000) survey results for benchmark importance and presence for the final 24 benchmarks. Gaide (2005a) linked higher student retention rates to institutions using the benchmarks to guide their online courses and programs. Other researchers have produced

results that discuss standards for quality in distance education, with standards similar to the IHEP benchmarks or benchmark categories (Barbera, 2004; Hanlon, 2004; Husson & Waterman, 2002; Roberts, Irani, Telg, & Lundy, 2005; Stewart, Hong, & Strudler, 2004). These studies provided support for various individual IHEP benchmarks or benchmark categories.

Bennett and Bennett (2002) surveyed distance education faculty from higher education institutions to determine if the final set of IHEP benchmarks for course development, teaching/learning process, course structure, and faculty support were present in their online courses. The authors considered faculty to be the best judge of quality for these benchmark categories. All the course development benchmarks rated high for presence in the survey. Teaching/learning benchmarks for interaction and feedback rated high for presence, with instruction in proper research methods rated low. Course structure benchmarks for determining motivation, providing supplemental course information, access to library resources rated high for presence, with time expectations for assignments rated low. Faculty support benchmark for technical assistance for faculty rated high for presence, with transition assistance and continuous faculty training rated low.

An interesting note is that Bennett and Bennett (2002) did not include students and administrators in their sample population and excluded faculty from rating benchmark categories for institutional support, student support, and evaluation and assessment. Considering the importance of interaction and feedback previously discussed and evaluated in this study, student opinion regarding these benchmarks should be valued. Students are the focus of the final IHEP benchmarks for course structure. Student

opinion for course structure benchmarks could add reliability to the author's survey. Faculty are also stakeholders for benchmark categories related to institutional support, student support, and evaluation and assessment. Faculty contribute significantly in the benchmarks for evaluating educational effectiveness, the teaching/learning process, and learning outcomes. The evaluation and assessment benchmarks are a critical factor in determining the quality of distance education and provide the mechanism for continuous improvement. The authors may have had limitations associated with their study such as time to conduct the study and access to subjects; however, a systems approach would advocate a more diverse sample which includes students and administrators.

There are a number of studies related to the benchmark categories of institutional support, course structure, and student support. La Padula (2003) provided a comprehensive study of student support services and asserted the quality of the student's learning experience went beyond course content and a program's curriculum. She analyzed student support and course structure services for library resources, admissions, textbooks, technical assistance, academic advising, bursar and financial aid finding these services to be an important component of students' online experiences. McGorry's (2003) results were similar to La Padula's reinforcing the importance of student support services for library resources, technical assistance, financial information, textbook purchase, and admissions. Mayes (2004) included the IHEP benchmarks in his review of distance education literature and recommended institutions provide for technical support, reliability in the technology infrastructure, library resources, Internet research instruction, and online academic advisement and financial services. The quality measures reported by

Husson and Waterman (2002) included online services for library resources, registration, and reliable technology infrastructure.

The Instructional Telecommunications Council (Dalziel & Payne, 2001) published a comprehensive monograph for student support and course structure services that provided practical suggestion for improving the quality of many of the IHEP student support benchmarks. Dirr (2003) cited the IHEP benchmarks and challenged institutional policy makers to evaluate the online student services for enrollment, textbook purchase, library resources, interaction with faculty and students, examinations, and administration information.

Library resources and services are considered by many authors to be important components of distance education courses or programs (Hufford, 2004; Mariasingam & Hanna, 2006; McKnight, 2003; Stella & Gnanan, 2004). The IHEP (2000) recognized this importance by including library resources in the IHEP benchmarks. Specific guidelines expanding the criteria of quality for library resources are provided by the American Library Association's Guidelines for Distance Learning Library Services (2004).

Curry (2003) called for more research in online academic advising support. Academic advising, although not specifically identified in the IHEP benchmarks, could be a critical support factor for many students and contribute to students' persistence in distance education. Most of the aforementioned student support services are identified by Moore & Kearsley (2005), to include support for Curry's (2003) academic advising. A noteworthy statement made by Moore and Kearsley frames the importance of student support as a benchmark, "A student support service has to be proactive as well as

reactive. If it only reacts to students who come forward to ask for help, many will be lost" (p. 182).

Quality in Distance Education: The IHEP Framework

Interaction and Feedback

The IHEP benchmarks contain student interaction with faculty and other students as an essential component of quality Internet-based distance education. A significant amount of literature discussed the importance of interaction to the quality of the distance education experience (Chih-Hsiung & McIsaac, 2002; Garrison & Cleveland-Innes, 2005; Parry & Dunn, 2000; Roblyer & Wiencke, 2003; Young & Norgard, 2006). The fascination of distance education scholars with interaction would appear to be related to the comparison of distance education with traditional face-to-face instruction. Distance education by most definitions includes a physical separation of student and instructor. The physical separation of student and instructor creates a learning environment without the nonverbal and spontaneous communications between instructors and students that are normally present in the traditional classroom (Leh & Jobin, 2002). Distance educators have focused on the interaction factor to create methods to mitigate the communication challenge of students being physically separated from their classmates and instructor (Sherry, 2003).

The importance of interaction to distance education can also be attributed to the influence of Moore's theory of transactional distance explaining the relationship of teachers and students (DeTure, 2004; Garrison & Cleveland-Innes, 2005; Kanuka, Collett, & Caswell, 2002; Lee & Gibson, 2003; Molinari, 2004). No other theoretical

framework can claim the influence Moore's transactional theory has had on the distance education research and literature. Dialogue and structure are the two elements comprising transactional distance theory that interact to overcome the communication challenges created by the physical separation of students and instructor (Moore & Kearsley, 2005). Interactions among students and instructors which promote a positive learning environment and function within the course or program structure comprise the dialogue component. The course or program structure function based on the design of course materials should include learning objectives, pedagogical techniques, and assessment.

Transactional distance operates along a continuum dependent upon structure and dialog. The author of this study developed a chart (see Figure 2) to graphically display the continuum described by Moore and Kearsley (2005).

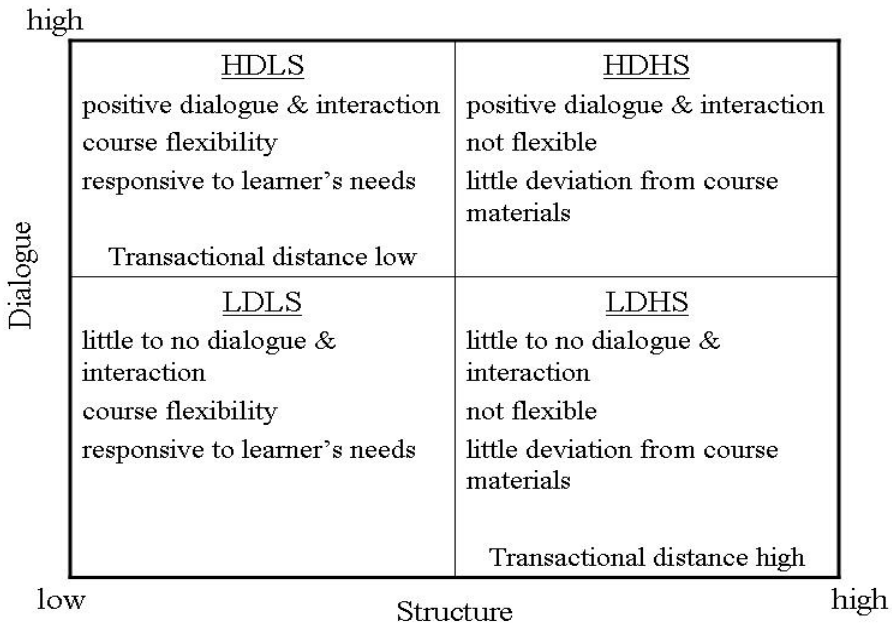


Figure 2. Transactional distance continuum as a function of dialogue and structure

The quality of the transaction depends on the communication medium and the methods and organization of course design (Moore, 1993; Moore & Kearsley, 2005). The level of learner autonomy corresponds to the amount of structure and dialog.

Moore (1989) had previously defined the dialogue component of transactional distance theory into three types of interactions: learner-teacher, learner-learner, and learner-content. A number of more recent studies support the need for positive interactions to create a quality distance learning experience (Anderson, 2003; Bonk & Dennen, 2003; Garrison & Cleveland-Innes, 2005; Giguere, Formica, & Harding, 2004; Lee & Gibson, 2003; Murphy & Coffin, 2003; Roblyer & Wiencke, 2003). Anderson and Garrison (1998) identified three additional interactions: interaction between teachers, interaction between teacher and content, and interaction between contents. Anderson (2003) extended the discussion of the six types of interactions and identified techniques for creating a single interaction or combinations of interactions.

Roblyer and Wiencke (2003) provided a comprehensive rubric for assessing the interactions of distance education (see Table 1). The rubric was based on an in-depth analysis of 44 articles related to the theory and characteristics of distance education interactions. Moore's transactional distance theory and three types of interaction form the cornerstone of Roblyer's and Wiencke's model and rubric for interactions between instructors, students, and content. Learning theories, instructional theories, instructional design models, and instructional delivery systems were additional factors considered by Roblyer and Wiencke in the design of their interaction rubric. The following three constructs were considered to be central in the design of the interaction rubric: (1) interaction of social, instructional, and technological variables contribute to

interaction, (2) student engagement in the learning process is most important, (3) collaborative experiences increase student engagement.

Table 1

Rubric for Assessing Interactive Qualities in Distance Courses
(Adapted from Roblyer & Wiencke, 2003)

Scale (points) Interactive qualities	Element 1 Social Rapport Building	Element 2 Instructional Design	Element 3 Technology Resources	Element 4 Learner Engagement	Element 5 Instructor Engagement
Low 1 point each	none	no two-way one-way delivery	Permits one-way delivery	50%-75% students reply to instructor messages when required to	Random responses instructor to students Feedback > 48 hours
Minimum 2 points each	brief intros one exchange of personal info	Respond to instructor on individual basis only	Permits two-way asynchronous communication	50%-75% students reply to instructor and other students messages when required and voluntary	Instructor responds to most students Feedback within 48 hours
Moderate 3 points each	Students share personal info one class activity to increase social rapport	Communicate with instructor Activities require communication with other students	Permits two-way asynchronous communication Synchronous supports written communications	90%-100% students reply to instructor and other students messages when required and voluntary	Instructor responds to all students Feedback within 48 hours
Above-average 4 points each	Moderate plus: Social/rapport among students and instructor	Moderate plus: Students collaborate and share feedback in small groups	Moderate plus: one-way visual two-way voice	By end of course: 50%-75% students replying to and initiating required and voluntary communication	Instructor responds to all students Feedback usually within 24 hours
High 5 points each	Above-average plus: Course structure promotes dialogue	Above-average plus: Share feedback with other groups	Above-average plus: two-way video synchronous voice and visual: instructor/student	By end of course: 90%-100% students replying to and initiating required and voluntary communication	Instructor responds to all students Feedback always within 24 hours

Roblyer and Wiencke (2003) constructed a five-element rubric using a five-point assessment scale. The five elements are: (1) social/rapport-building designs for interaction, (2) instructional designs for interaction, (3) interactivity of technology resources, (4) evidence of learner engagement, and (5) evidence of instructor engagement. The five-point scale ranged from low interactive qualities (1 point) to high level of interactive qualities (5 points). Roblyer and Wiencke also included criteria for the quality of learner engagement messages and instructor engagement feedback. Learner messages that are well-written and responsive to course content receive more points than brief or unorganized communications that are unresponsive to course content. Instructor feedback receives more points relative to the level of analysis and suggestions for improvement provided by the instructor.

The rubric would be completed for a course by determining the appropriate level for each element and totaling the number of points. The course's interactive quality would be based on the following scale:

Low interactivity: 1 to 9 points

Moderate interactivity: 10 to 17 points

High interactivity: 18 to 25 points

Instructor feedback to students was an important factor Roblyer and Wiencke (2003) included in their rubric for promoting high quality interactions. Timely and constructive feedback to students was one of the 24 IHEP benchmarks contributing to quality Internet-based distance education. The distance education literature contains numerous studies that support the significant contribution interaction and feedback provide in creating quality distance education experiences for students (Bennett &

Bennett, 2002; Dalziel & Payne, 2001; Lorenzetti, 2004; McGorry, 2003; Mayes, 2004; MacDonald, Stodel, Farres, Breithaupt, & Gabriel, 2001; Twigg, 2001; Young & Norgard, 2006). Interaction and feedback provide the distance education student the "humanness" connection (Barron, 2003), previously mentioned in Chapter I, to combat the isolation that may be experienced due to the physical separation of student and teacher. Internet-based distance education should provide students the tools to have the interactions and feedback required for a quality learning experience. Distance education students require alternative means to "raising-a-hand-in-class," visiting the instructor during office hours, and networking with classmates in "watercooler" conversations that are negated by geographical separation. Although many metacognitive activities may be internalized by a student, students may need to externalize their self-progress and self-assessment through interaction with instructors and other students.

Constructivist, Learner-centered, and Collaborative

Many researchers connect the IHEP (2000) benchmarks for interaction, feedback, and higher-order thinking skills to constructivist principles and a learner-centered approach to pedagogy (Choi & Johnson, 2005; Dabbagh, 2004; Leh & Jobin, 2002; MacDonald et al., 2001; Parry & Dunn, 2000; Schrum & Hong, 2002). Constructivism holds that individuals construct meaning based on their individual and social interactions with the world (Crotty, 1998; Merriam & Caffarella, 1999). The constructivist philosophy identified in the distance education literature includes the constructivist and social constructivist perspective. Although considerable discussions exists as to the knowledge claims and learning process between constructivism and social constructivism, both

perspectives offer value in promoting the "humanness" of distance technology. A constructivist approach, according to Merriam and Caffarella (1999) requires that, "meaning is made by the individual and is dependent on the individual's previous and current knowledge structure" (p. 263). Social constructivism focuses on the construction of knowledge and learning in social and cultural settings. Both philosophies, the individual cognitive development and social construction of knowledge, provide a framework for enhancing the quality of distance education.

Constructivism principles significantly inform learner-centered strategies (Huba & Freed, 2000) and distance technology activities (Gunawardena, Wilson, & Nolla, 2003; Peters, 2003; Sammons, 2003). Distance technology has applications for case-based instruction (Jonassen, et al., 1997), problem-solving activities (Carr-Chellman, 2001; Nulden, 2001), and critical-thinking exercises (Visser, Visser, & Schlosser, 2003; Yang, Newby, & Bill, 2005). Raya and Fernandez (2002) suggested the use of technology to promote learner autonomy and active learning. They also purport that Internet options can provide experiences and materials to facilitate active learning and help students learn to be autonomous learners. Granger and Bowman (2003) proposed a learner-centered systems approach to instructional design that uses technology to provide mentor support, constructivist experiential learning activities, and assessment of the learner's identity and prior learning. As an example, they recommended the sharing of students' learning autobiographies online to provide insight into identity, learning style, and to give the learner a feeling of belonging to a learning community.

There is considerable evidence in the literature that constructivist strategies promote active and collaborative learning, which when incorporated into the course

development, the teaching/learning process, and the course structure, improve the quality of the distance education experience (Moore & Kearsley, 2005). The collaboration among and between students and faculty members promotes an active learning environment and the need for more concerted interaction among all participants (Beldarrain, 2006; Kear, 2004; McClenney, 2004; Molinari, 2004; Schrum & Hong, 2002). The importance of interaction to the distance learner is expressed by Sherman and Kurshan in stating that "Constructing meaning comes from interacting with others to explain, defend, discuss, and assess our ideas and challenge, question, and comprehend the ideas of others" (2005, p. 12).

Collaborative problem-solving activities offer opportunities for self-directed learning, exploration, and learner-centered constructivist activities (Huang, 2002; Nokelainen, Miettinen, Kurhila, Floreen, & Tirri, 2005; Visser et al., 2003). Internet technologies, online library resources, and other student or instructor developed materials could be made available to facilitate the event. Technology provides almost unlimited capability to process and share information with others in an active collaborative learning environment. Internet-based technologies for communications, simulations, interactive multimedia and hypermedia, gaming, and access to online library and data sources are a few features that support learner-centered activities. Interactive communication strategies for promoting "humanness" are recommended by Ausburn (2004) since "push" strategies seem to be highly valued by adults." "Push" strategies could include using online communications such as bulletin boards, electronic mail, and discussion forums to provide course information and instructional scaffolds to increase learner-instructor interactions (Ausburn, 2004; Dabbagh, 2004; Nulden, 2001). Many higher education

institutions have online course management systems that provide an interface for Internet-based technologies to facilitate asynchronous and synchronous communications.

The distance education literature strongly supports the need for interaction, collaboration, and learner-centered constructivist learning environments. However, as Paulus (2006) noted, "putting students in groups does not automatically result in collaborative interactions..." (p. 113). Interactions operate on a continuum from little or low interaction to high interaction levels for each of the six types of interactions previously mentioned. Individual students must discover what levels of interaction in combination create a successful learning experience for them and be motivated to actively engage in the learning environment. Related to Moore's and Kearsley's (2005) transactional distance theory, some students may master learning objectives where transactional distance is high with virtually no communications with the instructor or other students, but with a high level of learner-content interaction. The student not participating in online asynchronous threaded discussions may be actively engaged in the course through other types of interactions.

Learning Styles

Consideration of student learning styles, while included in the original 45 IHEP benchmarks but not included in the final 24 IHEP benchmarks, remains a topic of study for many researchers (Aragon, Johnson, & Shaik, 2002; Bonk & Zhang, 2006; DeTure, 2004; Fahy & Ally, 2005; Neuhauser, 2002; Twigg, 2001). Developments in Internet and telecommunication technologies provide new methods for instructional designers to accommodate learning styles related to learner preferences for visual, auditory, text-based

materials, or multimedia. There is also a growing body of research concerned with accommodations to create an online learning environment for persons with disabilities (Edmonds, 2004; Levy & Beaulieu, 2003; Kinash, Crichton, & Kim-Rupnow, 2004). However appealing to researchers, the decision of the IHEP (2000) to not consider learning styles in their final 24 benchmarks may be warranted. Few empirical studies have found preferences for learning style to be related to student achievement or satisfaction. Hannafin et al. (2003) cited several studies which found the effect of learning style on student achievement as not significant and not a predictor of student success in distance education courses. The study conducted by Aragon et al. (2002) also found the relationship between learning style and student success was not significant.

Motivation and Commitment

Even though some students may achieve learning outcomes without interaction, the active learner has a decided advantage over the passive learner (Montelpare & Williams, 2000). Calvert (2005) echoed the support for active learning in distance education,

> Online technologies are attractive because they provide the opportunity to create rich learning environments consisting of multimedia resources and facilities for communication and interaction. Concurrently, changing views of what are appropriate teaching and learning strategies in higher education emphasize active engagement of students rather than the passive receipt of knowledge. (p. 232)

Motivation and commitment are critical components that enable students to be actively engaged and successful. The IHEP (2000) recognized the critical importance of student motivation and commitment by their inclusion in the final 24 IHEP benchmarks.

Motivation is a key variable in the persistence of learners in distance education courses (Garrison, 1997; Knowles, Holton III, & Swanson, 1998). There are a number of factors influencing adults who participate in higher education. The changing U. S. demographics of an increased older population with the aging of baby boomers and the increased number of adults enrolling in nontraditional educational opportunities, to include distance education, supports connecting adult learning principles with the design of learning activities incorporating distance technology (Chaffin & Harlow, 2005; Kim & Merriam, 2004). The IHEP benchmark for motivation and commitment was categorized under the course structure benchmark category. The benchmark requires students be advised "before starting an online program" to determine if they have the requisite motivation and commitment. Instructors identifying requirements, prior to the beginning of an online course, for assignments and expected time commitment on the student's part may help students make an informed decision to determine if they have the motivation and commitment to be successful in an online course. The initial 45 IHEP benchmarks contained expectations for student time commitment and the result was that the final 24 IHEP benchmarks included expectations for student assignment completion and faculty response to the assignments.

The initial 45 IHEP benchmarks and the final 24 IHEP benchmarks identified the need for students to be motivated and committed to be successful in distance education courses. The final benchmark for motivation and commitment also included the need for

students to have access to the minimal technology required by the course design. Pre-course assessment may help inform students as to the demands and expectations of distance education course work, especially those who are taking an online course for the first time. A strategy to complement a pre-course assessment would be to include pedagogical strategies for promoting and sustaining learners' motivation during the online course. Additionally, students may need online support services to help with technology problems that can become a source of major frustration and impede the completion of assignments.

Pedagogical strategies that include principles of adult learning would enhance the quality of distance education and help maintain the adult learner's motivation and commitment to the educational program (Ausburn, 2004; Huang, 2002; Hudson, Greer, & Buhler, 2001; Moore & Kearsley, 2005). The principles of andragogy and self-directed learning serve as the cornerstone for strategies to motivate adult learners. Andragogy is a learner-centered approach for the teaching of adults (Knowles et al., 1998). Adults are motivated to learn when learning will help them solve problems or satisfy an intrinsic need. The adult learning theory of andragogy is based on the work of Malcolm Knowles. Knowles' model of andragogy consists of six assumptions: (a) the learner's need to know; (b) the learner's self-concept; (c) the role of the learners' experience; (d) the learner's readiness to learn; (e) the learner's orientation to learning, and (f) the learner's motivation to learn (Knowles et al., pp. 64-68).

The self-directed learning model has been one of the most discussed and researched topics that have influenced adult education (Brookfield, 1986; Garrison, 1997; Hiemstra & Brockett, 1994). The importance of self-directed learning to the field of adult

education can be found in estimates that approximately 70 percent of adult learning is self-directed learning (Lowry, 1989; Merriam & Caffarella, 1999). Garrison suggested self-directed learning was the central theme making adult education a distinctive field of study. Brookfield (1986) and Knowles et al. (1998) discussed the needs and experiences of adult learners developing the self-directedness of adult learning, which gives autonomy and initiative to the learner. This connection provides a path to the importance of self-directed learning and the student's distance education experience. Self-directed learning skills are needed by students to be successful in overcoming the physical separation from the course instructor and his or her classmates.

The influence of Knowles's andragogy is apparent when he presents his own definition that self-directed learning is:

> A process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes. (1975, p. 18)

Additional definitions are found in the literature, all of which stressed the individual initiative and responsibility for the learning experience (Merriam & Caffarella, 1999; Seaman & Fellenz; 1989). Seaman and Fellenz referred to self-directed study as "… adult-learning efforts that are initiated and directed by the individual" (p. 26). Merriam's and Cafferella's definition stated "Self-directed learning as a process of learning, in which people take the primary initiative for planning, carrying out, and evaluating their own learning experiences…" (p. 293). Andragogy and self-directed learning principles

are learner-centered and humanistic (Elias & Merriam, 1995; Merriam & Caffarella). According to Brockett (1994, p.10), "It is not difficult to see the compatibility of these ideas [humanism] with the notion of self-direction." The humanistic factors of intrinsic motivation and satisfaction of a psychological need for learning can be inferred from the self-directed learning concept.

Garrison (1997) offered a comprehensive model of self-directed learning. His model includes three intersecting elements: self-management, self-monitoring, and motivation. He sees motivation as the strongest thread throughout the self-directed learning process. Learners must be motivated when they initially begin the learning activity and be committed to the goals they set. Motivation continues to be important as the learner maintains the learning activity and takes responsibility for achieving the desired outcomes.

Garrison (1997) perceived a more reciprocal relationship between instructor and student, since he believes students do learn in isolation, but in a constructivist environment through interaction with others. Brookfield identified the collaborative environment as important to successful self-directed learning, "…learning activities are explicitly placed within a social context, and they cite other people as the most important learning resource. Peers and fellow learners provide information, serve as skill models, and act as reinforcers of learning and as counselors in time of crisis" (1986, p. 44). Both Garrison and Brookfield support the need for the interaction which was included in the IHEP benchmarks.

Ausburn (2004), Christensen (2003), and Denis (2003) proposed a blended learning approach that supports adult education principles and the self-directed learning

process. The Center for Academic Transformation at Rennselaer Polytechnic Institute managed an $8.8 million grant awarded by the Pew Charitable Trust to redesign courses at 30 post-secondary institutions (Twigg, 2003). Twigg identified several redesign models utilizing blended learning techniques. Promoting active learning, learner-centered designs, and incorporating information technology are key components of the redesign models. All the aforementioned instructional activities support IHEP benchmarks within the teaching/learning and course structure benchmark categories, and the course development benchmark to engage students in high-order thinking skills.

Faculty Role

The IHEP (2000) benchmarks most appropriately identified the significant role the instructor plays in providing quality distance education. Various authors have identified the pedagogical differences between traditional classroom environments and distance education (Bennett & Bennett; 2005; Eastman & Swift, 2001; Irani & Telg, 2002; Kanuka et al., 2002; Young, 2006). Mayes (2004) in his review of the distance education literature included a review of the distance education studies conducted by the IHEP (1999, 2000). The review highlighted the need for professional development for faculty to make the transition from traditional face-to-face classrooms to online distance education. The instructor normally has the primary responsibility for planning, designing, and facilitating the online learning experience. Even though some institutions employ a team approach which includes instructors, instructional designers, and multimedia specialists, the instructor is still the cornerstone in providing a quality learning environment.

While the studies of distance education provide valuable insight into the importance of the instructor, the need for faculty support benchmarks may be deemed appropriate considering the criticisms leveled at some online courses. Courses considered primarily text-based "page-turners" with no interaction may result from faculty attempting to hurriedly replicate their face-to-face courses to web-based courses using a course management system. MacDonald et al. (2001) cautioned against the practice of simply converting the textbook into an electronic page format.

The pedagogical factors influencing the quality of online education to include the use of technology to facilitate the different types of interaction and collaboration previously mentioned could be significantly improved through instituting assistance or training programs related to the faculty support benchmarks. The instructor may require new skills to design online education to achieve learning outcomes. The potential importance of asynchronous and synchronous communications to achieving learning outcomes may require faculty to develop expertise as online facilitators (Giguere & Minotti, 2003). Online facilitators need to stimulate student participation, determine when to intercede in students' communications to scaffold instructional activities, and how to monitor the progress of collaborative activities. As with any education program, poor design creates a poor learning experience (Farrell, 2001; Twigg, 2001; Young, 2006). Courses not containing activities that require students to interact and collaborate with their instructor and other classmates create isolation for the student and do not promote the constructivist environment previously identified by Garrison (1997) and Brookfield (1986). According to MacDonald et al. (2001), "the design of the learning experience is the cornerstone of quality WBL [web based learning]" (p. 14). Faculty are

the chief architects of designing the quality learning experience and require the skills to design effectively for the online environment.

Evaluation and assessment

Ellis and Moore (2006) emphasized that student learning should be the focus of an institution's evaluation and assessment of distance education programs and the use of technology. The authors emphasized that technology serves as tool that enables student activities and learning. The authors agreed with the final IHEP benchmark that learning outcomes, not availability of existing technology, should determine the appropriate technology to use to deliver course content. Various studies have echoed this concept that the standard should be for how the technology supports the learning objectives and not be related to the technology itself (Gaide, 2005b; Mayes, 2004; McGorry, 2003). Some instructors and instructional designers have created course activities just to facilitate the use of new technology. Mayes, McGorry, and Sherry (1995) cautioned against letting the focus of designing learning activities become the goal to include as many technology tools as possible and lose sight of developing activities that enable students to master course objectives. Gaide connected learning, pedagogy, and technology in a learner-centered approach where the technology is responsive to learner needs. Ellis asserted that technology be judged on how students and faculty use the technology and whether the technology impedes student learning.

The distance education literature provided studies that described evaluation methods, to include formative, summative, and authentic assessment, for determining whether students have attained the expected learning outcomes (Lockee, Moore, &

Burton, 2002; Roberts et al., 2005). Other authors have focused on methods to evaluate programs at the institutional level or the program components that support providing distance education, such as instructional design, faculty development, or student support and satisfaction (Bennett & Bennett, 2002; Ellis & Moore, 2006; Stella & Gnanam, 2004; Stewart, Hong, & Strudler, 2004; Thurmond, Wambach, Connors, & Frey, 2002; Young, 2006). Rovai (2003) called for multiple sources of evidence within a total systems model to evaluate distance education programs. He noted the preponderance of one-shot case studies which focused on only one component of a course or program or relied solely on student satisfaction surveys limits the information needed for a comprehensive program evaluation. Rovai summarized the importance of a holistic approach to evaluation in this way:

> It is important to evaluate distance education programs by how they work as a whole rather than by evaluating individual components without regard to overall program effectiveness. By way of analogy, there is no need to have an expensive, high-performance carburetor in a motorbike if the rider rarely revs the engine past 5000 rpm. (p 113)

The cause of poor quality or problems in one aspect of a program may be difficult to determine and solve without analyzing the relationships among all system components.

Accreditation and Quality

Many administrators and faculty in higher education equate quality in Internet-based distance education as being synonymous with accreditation. Hanlon (2004) identified this belief when she stated, “the accreditation system in the United States has

been viewed as the mechanism to ensure quality assurance in higher education" (p. 152). The proliferation of distance education along the continuum from individual courses to entire degree programs amplifies the importance of the accreditation process (Bryant et al., 2005). Students are a major stakeholder in the accreditation process as they may place trust in the institution to avoid the "diploma-mills" and non-accredited programs. Various researchers have studied accreditation of distance education programs and cited the IHEP benchmarks as a source for quality standards (Ellis & Moore, 2006; Hanlon, 2004; Stella & Gnanam, 2004). The authors noted the similarities between the IHEP benchmark categories and the categorizations used by the accrediting organizations. The commonalities of the constructs that define quality in distance education give validity to their use as guidelines or standards.

Accreditation of higher education programs is governed by eight regional accrediting commissions. The eight regional accrediting organizations are: (1) Middle States Association of Colleges and Schools, Middle States Commission on Higher Education, (2) New England Association of Schools and Colleges, Commission on Institutions of Higher Education, (3) New England Association of Schools and Colleges, Commission on Technical and Career Institutions, (4) North Central Association of Colleges and Schools, The Higher Learning Commission, (5) Southern Association of Colleges and Schools, Commission on Colleges, (6) Western Association of Schools and Colleges, Accrediting Commission for Community and Junior Colleges, (7) Western Association of Schools and Colleges, Commission for Senior Colleges and Universities, and (8) the Northwest Commission on Colleges and Universities. The eight regional accrediting organizations are recognized by the U.S. Department of Education (USDE)

and the Council for Higher Education Accreditation (CHEA) to accredit higher education institutions and programs within their geographic region. According to the USDE (2005), "The goal of accreditation is to ensure that education provided by institutions of higher education meets acceptable levels of quality" (2006, http://www.ed.gov)

The guidelines published by the regional accreditation organizations are closely related to the IHEP benchmarks. The guidelines may be found in *Distance Learning Programs: Interregional Guidelines for Electronically Offered Degree and Certificate Programs* (Middle States Commission on Higher Education, 2002) as *The Best Practices for Electronically Offered Degree and Certificate Programs*. The Middle States Commission on Higher Education (MSACHE) guidelines were initially developed by the Western Cooperative for Educational Telecommunications and adopted individually by the eight regional accrediting commissions. According to the New England Association of Schools and Colleges, Commission on Institutions of Higher Education:

> These *Best Practices* are meant to assist institutions in planning distance education activities and to provide a self-assessment framework for those already involved. For the regional accrediting associations they constitute a common understanding of those elements which reflect quality distance education programming. As such they are intended to inform and facilitate the evaluation policies and processes of each region. (Introduction section, ¶ 2)

The *Best Practices for Electronically Offered Degree and Certificate Programs* (MSACHE , 2002) are categorized according to the following five groups, which resemble the IHEP benchmark categories: institutional context and commitment, curriculum and instruction, faculty support, student support, and evaluation and

assessment. The five groups contain a total of 28 best practices with each practice having specific questions that further inform the best practice. Although the title infers applicability to degree and certificate programs, *Best Practices for Electronically Offered Degree and Certificate Programs* offers quality criteria for the continuum of distance education programs from individual courses to entire degree programs. Novak (2000) critiqued the IHEP benchmarks and *Best Practices for Electronically Offered Degree and Certificate Programs* identifying similarities or dissimilarities between the two documents.

The eight regional accrediting organizations have embedded references to distance education within their standards of accreditation for higher education. The New England Association of Schools and Colleges, Commission on Institutions of Higher Education Standards of Accreditation (2005) stated,

> The institution offering programs and courses for abbreviated or concentrated time periods or via distance learning demonstrates that students completing these programs or courses acquire levels of knowledge, understanding, and competencies equivalent to those achieved in similar programs offered in more traditional time periods and modalities. (p. 12)

The New England Association of Schools and Colleges, Commission on Institutions of Higher Education Standards of Accreditation also calls for "Students enrolled in off-campus courses and/or distance learning course have sufficient opportunities to interact with faculty regarding course content and related academic matters" (2005, p. 12). These accreditation standards are consistent with the IHEP benchmarks since they promote centering learning outcomes within the course

development and evaluation/assessment benchmark categories and the interaction benchmarks within the teaching/learning process benchmark categories. The New England Association of Schools and Colleges, Commission on Institutions of Higher Education Standards of Accreditation are consistent with the IHEP benchmarks for library services and research skills for library and other information resources,

> Faculty, staff, and students are provided appropriate training and support to make effective use of library and information resources, and instructional and information technology...The institution ensures appropriate access to library and information resources and services for all students regardless of program location or mode of delivery. (2005, p. 20)

The preceding are but a few examples of criteria that regional accrediting organizations have incorporated into standards originally designed for traditional classroom-based higher education and the relationship to IHEP benchmarks. The Middle States Association of Colleges and Schools, Middle States Commission on Higher Education (2006) has included a special section within their accreditation standards entitled, "Fundamental Elements of Distance or Distributed Learning" which lists eleven attributes institutions are expected to meet for accreditation. Gratch-Lindauer (2002) provided a comprehensive analysis of the regional accreditation standards using a content analysis to make recommendations for academic libraries. Her study discussed distance learning and contained a review of *Best Practices for Electronically Offered Degree and Certificate Programs* (MSACHE, 2002) that emphasized the importance of services to meet student needs just as those services are reflected in the IHEP benchmark recommendations.

Other organizations have published standards or guidelines to inform higher education institutions of accrediting organization criteria for distance education. In addition to the eight regional accrediting organizations, there are numerous faith-based, private career organizations, and specialized and professional accrediting organizations recognized by the U.S. Department of Education or the Council for Higher Education Accreditation (CHEA) that accredit various educational programs. Many of these organizations have published standards or guidelines to inform higher education accreditation requirements for distance education. The Association of Collegiate Business Schools and Programs, National Council for Accreditation of Teacher Education, and the Commission on Collegiate Nursing Education are examples of specialized accrediting organizations.

The Council for Higher Education Accreditation (CHEA) operates as an umbrella organization for these accrediting organizations and over 3,000 universities and colleges. CHEA advocates academic quality through accreditation and serves as a conduit for accreditation with the U.S. Department of Education. CHEA (2002) identified seven key themes to be addressed by accrediting organizations when reviewing distance education programs at various institutions. These themes include:

1. Institutional mission
2. Institutional organizational structure
3. Institutional resources
4. Curriculum and instruction
5. Faculty support
6. Student support

7. Student learning outcomes

The seven CHEA categories are the same or similar to the IHEP benchmark categories. CHEA provided examples within each category, taken from various accrediting organizations, to illustrate quality standards for distance education. Accreditation through external peer review provides but one method for ensuring quality in distance education (CHEA, 2001).

Systems Approach

Systems theory maintains that the functioning of the total system is dependent upon the functioning of each component of the system. Poor quality in one or more of the IHEP benchmarks has a negative effect on the total distance education program. An institution must invest the appropriate human and financial resources in each benchmark category as each category is mutually dependent. Research in distance education must follow a broad agenda that does not focus solely on an individual benchmark or benchmark category. Likewise, there should be research that studies distance education as a system. Institutions should evaluate their distance education programs by asking assessment questions in a systems context. How does faculty design interaction in their courses if the institution does not have the supporting infrastructure and technology that facilitate communications? How do you know if student support services are adequate without a system in place to evaluate the services? What library services are required to support course design efforts and the teaching/learning process? The systems approach to quality in distance education suggests that the IHEP benchmarks must function together or total quality will be degraded.

A number of studies supported a systems view of conducting research in distance education (Bennett & Bennett; 2002; Bryant et al., 2005; Novak, 2002; Thurmond et al., 2002; Tosh, Miller, Rice, & Newman, 2000). Other scholars have proposed distance education frameworks that may be examined at the individual component level or in a holistic systems manner (Bonk & Dennen, 2003; Sherry, 2003; Watkins & Schlosser, 2003). Moore & Kearsley (2005) and others (Jung, 2001; Granger & Bowman, 2003; Lee & Gibson, 2003, Zhang, 2005) promote learner-centered systems where the various subsystem interactions affect the quality of the students' learning experience. Thurmond et al. (2002) studied an input-environment-outcomes model that argues for a systems approach for conducting educational evaluations for web-based education using criteria similar to the IHEP benchmarks. The common thread among scholars who include a systems view of distance education was summarized by Saba (2005): "Systems are composed of interrelated parts that not only affect each other but are also affected by each other. In isolation, each component cannot function, or its function would be very limited" (p. 4).

Compora's (2003) research offered a systems model for administering and managing distance education. The following nine components constitute his Distance Education Administrative Operative Model:

1. Assessment
2. Budget
3. Coordination
4. Delivery methods
5. Evaluation

6. Faculty involvement and training

7. Generate a mission statement

8. Hierarchical Approval System

9. Implementation

The descriptions of the model's components have direct similarities to the IHEP benchmark categories. The components of the model are not to be planned or conducted sequentially, but holistically where each component may affect one or multiple components. Compora's (2003) qualitative study of six higher education institutions discovered discrepancies between institutional practice and research findings. He also found institutions not following his systems design model and attributed this problem to the institutions' disregard for scholarly literature and called for further research in the components of distance education.

Several authors presented graphical representations of their systems model (Chute, 2003; Moore & Kearsley, 2005). The models are designed to demonstrate the components of the system working together for a common purpose. The common purpose, the center of the model for Chute, Moore and Kearsley was the student. Figure 3 represents a systems model framework developed by the author of this study based on the IHEP benchmarks.

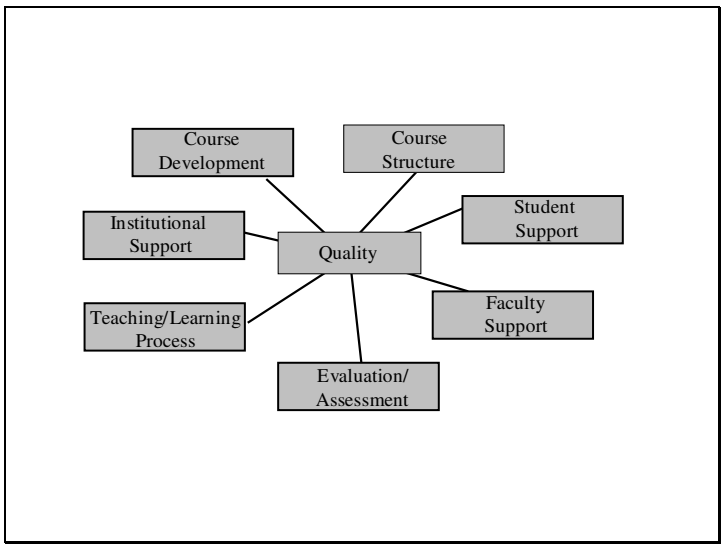


Figure 3. Systems model using IHEP (2000) benchmarks

The graphic serves as a visual model illustrating the relationships among the subsystems that contribute to the function of the overall system. Figure 3 illustrates the benchmark categories as the subsystems contributing to the overall system quality.

Previous Reviews and Analysis of Research in Distance Education

The purpose of this section is to examine previous reviews of the literature in distance education. The five studies selected were: (1) Koble and Bryant (1997), (2) Anglin and Morrison (2000), (3) Berge and Mrozowski (2001), (4) Rourke and Szabo (2002), and (5) Lee et al. (2004). These authors reviewed journal articles, except for Berge and Mrozowski who included dissertations in their review of journal articles, to analyze bibliographic data, content topic of articles, and research methods (see Table 2). Table 2 also provides the name of the journals reviewed by the authors, number of articles in the sample, and the time period the journals were published. Finally, the analysis of citations (see Table 2) is included in the Lee et al. study. Additionally, the

three most recent of the five studies that were examined referenced some of the earlier studies that were examined and two of the studies referenced the 1999 IHEP report (see Table 3).

Table 2

Summary Chart of Five Previous Reviews and Analysis of Research in Distance Education

Authors	Koble & Bunker	Anglin & Morrison	Berge & Mrozowski	Rourke & Szabo	Lee, Driscoll, & Nelson
Date of review	1997	2000	2001	2002	2004
Journals reviewed & timeframe	AJDE 1987 – 1995	AJDE 1987 – 1999 DE 1991 – 1999	AJDE DE JDE Open Learning Dissertations 1990 – 1999	JDE 1986 – 2000	AJDE DE JDE Open Learning 1997 – 2002
Number of articles reviewed	129	383	890	235	383
Analyzed or Identified	authors audience article topic research methods	authors article topic type of article type of data	authors research methods research problem article	authors type of article article topic	authors research methods article topic
Analysis of citations	no	no	no	no	yes 8,409 citations

AJDE: The American Journal of Distance Education
DE: Distance Education
JDE: Journal of Distance Education

Table 3

Summary of Reference Relationships Among Five Studies Reviewed

Authors	Koble & Bunker	Anglin & Morrison	Berge & Mrozowski	Rourke & Szabo	Lee, Driscoll, & Nelson
Date of study	1997	2000	2001	2002	2004
References to five studies reviewed or IHEP 1999	none	none	Anglin & Morrison IHEP (1999) Koble & Bunker	Berge & Mrozowski Koble & Bunker	Rourke & Szabo Berge & Mrozowski Anglin & Morrison IHEP (1999) Koble & Bunker

IHEP: Institute for Higher Education Policy

The five studies had similar research questions used to analyze the topics and research methods found in the publications included in the literature sample. Although the five studies focused on different classification schemes for their analysis of topics and research methods, a consolidated taxonomy for topics and research methods was constructed by the author of this study to integrate the categories of the five studies. Categorical definitions or themes identified in the five studies were used as the basis for the integrated categories. The results reported by the five studies for topic and research method were summarized using the consolidated taxonomy (see Tables 4 and 5). The remainder of this section contains a discussion of each of the five studies, validity and reliability information for the five studies, and a summary.

Table 4

Topic of Article Summary Chart for Five Studies

	Topic of Article %									
Author	Theory, research, foundations, & policy	Psychology of distance learning	Student & faculty admin/support	Instructional design & pedagogy	Methods, technology, systems, & facilities	Admin, operational issues & staffing	Literature review	Evaluation	Lessons learned & practice	Other
Koble & Bunker	26	15	2	21	21	15				
Anglin & Morrison	68[1]						4	4	16	8
Berge & Mrozowski	11	17	15	38	11	8				3
Rourke & Szabo	22	10	6	11	13	12		5	6	15[2]
Lee et al.	31		11	27	9	10		12		

Note 1: 68% classified topic of article by research method without assigning to content category
Note 2: article reported 85% by category, 15% unassigned

Table 5

Article Research Method Summary Chart for Five Studies

	Article Research Method %				
Author	Descriptive	Case study	Quantitative, Correlational, or Experimental	Mixed	Qualitative
Koble & Bunker	63	0	30	2	5
Anglin & Morrison	81	0	9	0	0
Berge & Mrozowski	75	12	13	0	0
Rourke & Szabo	65	0	5	7	23
Lee et al.	46	36	12	6	0

Koble and Bunker (1997) conducted a review of 129 journal articles published in *The American Journal of Distance Education* from 1987 to 1995. The framework for their review was based on Porter's (1986) forum analysis for examining the communications of a discourse community which guided the researchers in answering the following set of questions for each of the 129 articles. These guiding questions were:

1. Who are the authors?
2. Who is the intended audience?
3. What are the topics of the articles?
4. What methods do the authors utilize to conduct the research?

Answers to the four questions were entered into a database to facilitate analysis and organize findings. Koble and Bunker (1997) also provided a historical analysis of *The American Journal of Distance Education*, procedures and protocols for submitting articles, and a brief review of the refereed review of submitted articles.

Primary authors were identified and author information categorized by organizational affiliation, disciplinary field, role within their organization, and country was entered into the database. Subscription data for *The American Journal of Distance Education* was evaluated by the researchers to provide data on the intended audience for the journal articles. Topic analysis was conducted by reviewing the abstracts of the 129 articles and by categorizing each according to a classification scheme used by the International Centre for Distance Learning at the Open University in the United Kingdom. Research methodologies for the journal articles were classified into one of four research categories: quantitative, qualitative, literature reviews, mixed methods; or as non-research.

Koble and Bunker (1997) drew the following conclusions as a result of their article examination: (a) authors were primarily affiliated with higher education and came from the United States (70%) or Canada (20%), (b) the articles focused on the effectiveness of distance education, the use of telecommunication technology, and interactions in distance education, (c) ninety-two percent of the subscribers were from higher education and libraries represented the largest subscribers, and (d) approximately 40% of the journal articles fell into one of the four research categories with the remaining 60% in the non-research category (discussion and descriptions).

Anglin and Morrison (2000) analyzed 383 journal articles published between 1987 and 1999. Two hundred twenty-two articles were published in *The American Journal of Distance Education* from 1987 to 1999. One hundred sixty-one articles were published in *Distance Education* between 1991 and 1999. The authors collected data from the journal articles regarding author's name, publication date, type of article, topic of article, and type of data collected. Anglin and Morrison also created a database for their data collection.

Anglin and Morrison also reported many of the research gaps and shortfalls in the distance education articles they reviewed as reported by the IHEP in 1999:

- preponderance of anecdotal evidence pertaining to a individual program
- lack of theory-based studies
- lack of distinction between instructional technologies and delivery technologies
- need for more data on assessing student learning vs. student motivation and attitudes

- few comparative or multiple methods research studies

Anglin and Morrison concluded their article review by discussing the need for more research and theories related to systems thinking in distance education. The authors advocate distance education researchers promote systems theory where all the components necessary to provide courses or programs are taken into account. The translation for this study would be that quality in Internet-based distance education is increased when all the IHEP benchmark categories are considered in a distance education program.

Berge and Mrozowski (2001) evaluated 1,419 journal articles and dissertation abstracts published from 1990 to 1999. The articles were published in *The American Journal of Distance Education*, *Distance Education*, *Journal of Distance Education*, and *Open Learning*. Dissertations found by searching *Dissertation Abstracts International* using the keywords *distance education* and *distance learning* were included in the literature review evaluation. The authors limited their search to journal articles and dissertations that included a section on research methodology resulting in 890 of the 1,419 (62.7%) documents meeting the criteria for content and methodology. Six hundred forty-six (72.6%) dissertation abstracts and 244 (27.4%) journal articles comprised the literature evaluation.

The journal articles and dissertations were classified according to content area and research methodology. The scope of the article evaluation included a review of each dissertation's abstract and a reading of the body of the journal article. As in the previous study, Berge and Mrozowski created a database to collect the article characteristics based on journal identification data, article content information, author, and research

methodology. Database elements for the journal, article, and author included journal name, volume number, volume issue, publication date, article title, and author's name. Content areas were categorized according to an adaptation of Sherry's (1996) ten research issues. These ten research issues were:

1. Redefining roles of key participants
2. Technology selection and adoption
3. Design issues
4. Strategies to increase interactivity and active learning
5. Learner characteristics
6. Learner support
7. Operational issues
8. Policy and management issues
9. Equity and accessibility
10. Cost/benefit trade-offs

The authors followed the research methodologies of the IHEP (1999) categorizing the studies as descriptive, case study, correlational, or experimental.

The authors' content analysis revealed that design issues, interactivity and active learning, and learner characteristics dominated the types of questions addressed in the research. Berge and Mrozowski also agreed their evaluation found the same gaps in the literature as found by the 1999 IHEP report. Their conclusions revealed similar findings that distance education researchers have limited their focus to individual courses and technologies. The authors endorsed the IHEP's position that researchers need to expand their focus to study total academic programs and study the interaction of multiple

technologies. Also, the authors called for additional research to explain high dropout rates of distance learners compared to traditional classroom instruction. Finally, the authors stated the need for increased research into the effectiveness of digital libraries.

Rourke and Szabo (2002) analyzed 235 documents from the *Journal of Distance Education* from 1986 to 2000. The primary purpose of Rourke's and Szabo's content analysis was "to provide this information primarily for the benefit of researchers who should be aware of the state of distance education literature, its gaps, and areas of saturation" (p.3). The authors included articles, editorials, book reviews, letters to the editors, and discussions in their analysis. The documents were published in English (75%), French (12%), and English and French (13%). The documents were classified according to publication type, topic, research method, and primary author information. The authors developed topical categories from a review of topic organizations found in distance education textbooks. Higher education accounted for 72% of primary author affiliation.

Lee et al. (2004) evaluated 383 journal articles published from 1997 to 2002. The articles were published in *The American Journal of Distance Education*, *Distance Education*, *Journal of Distance Education* and *Open Learning*. According to Lee et al., "These journals were selected because of their recognition among researchers as the most prominent in the distance education field, and because they had been used as data sources in previous studies" (p. 226). The authors excluded editorials, commentaries, and book reviews found in the four journals.

The 383 journal articles were classified according to content topic and research methodology. Content topic classification was based on a modification to Sherry's

categories (1995). Research methods were based on a modification of the classification system employed by previous evaluations of distance education literature (Berge & Mrozowski, 2001; Koble & Bunker, 1997; Anglin & Morrison, 2000; Klein, 2002). Lee et al. categorized theoretical inquiry, evaluation research, developmental research, and survey research as descriptive studies. Lee and colleagues also conducted a keyword analysis as part of their content analysis to show thematic trends over the six-year period the journal articles had been published. The frequency of the keywords in order of occurrence, were interaction, learners, perception, collaboration, videoconferencing, program evaluation, and faculty support.

A distinction of the Lee et al. study as compared to the other four studies was the analysis of the citations found in the reference lists of the 383 journal articles. Previous studies reviewed in this section only evaluated the content and bibliographic data associated with the citing journal article. Their purpose of analyzing citations was to identify the primary authors and publications that had contributed to distance education research. The author's analysis of the reference lists found in the 383 journal articles produced a total of 8,409 citations. The authors only considered the primary author of citation in their analysis. The frequencies of primary citation authors were ranked according to the total number of citations. The top five rankings, with citation frequency (*f*), were:

1. Moore, M.G. (105)
2. Garrison, D.R. (86)
3. Harasim, L.M. (62)
4. Kember, D. (61)

5. Bates, A.W. (61)

Lee et al. cautioned interpreting primary author frequencies due to possible bias in the results since several high ranking authors were found in only one or two of the four journals evaluated in their study. An author's high ranking was based on having a few studies being extensively cited in one or two journals as opposed to an author who has multiple studies cited in all four journals, but had a lower overall total frequency.

Finally, Lee et al. analyzed the 8,409 citations for frequencies of cited books, journal articles, and book chapters. The top three rankings for book citations, with citation frequency (*f*) were:

1. Moore, M.G. and Kearsley, G. (1996). *Distance education: A systems view*. (23)
2. Harasim, L., Hiltz, S.R., Teles, L., and Turoff, M. (1995). *Learning networks: A field guide to teaching and learning online*. (21)
3. Laurillard, D. (1993). *Rethinking university teaching: A framework for the effective use of educational technology*. (20)

The top two rankings for journal articles and book chapters with citation frequency (*f*) were:

1. Moore, M.G. (1989). Three types of interaction. *The American Journal of Distance Education*, vol. 3 no.2. (16)
2. Moore, M.G. (1993). Theory of transactional distance. In *Theoretical principles of distance education*, ed. D. Keegan (13)

Lee et al. (2004) noted that not including secondary authors was a limitation of their citation analysis. Many secondary authors may have made significant contributions to their study's research.

Validity and Reliability

Validity and reliability issues were briefly addressed in the five studies reviewed above. Koble and Bunker (1997) provided the most detailed procedures for reliability and validity concerns. Both Koble and Bunker (1997) independently classified the journal articles by topic category. Differences between the two authors were discussed, and sometimes required a review of the article to reach consensus. Outside raters were employed by Koble and Bunker (1997) to review a random sample of abstracts and determine topic classification. Inter-rater reliability was 0.71, which was low according to Koble and Bunker, who indicated the low reliability "...points to the difficulties in forcing articles into one main category" (p. 30). Collaboration among the authors to reach consensus of coding decisions was also used in two of the studies (Anglin & Morrison, 2000; Berge & Mrozowski, 2001). Rourke and Szabo (2002) reported a 0.93 inter-rater reliability for one author coding all the items and the second author coding a 10% random sample. Lee et al. conducted an inter-rater reliability test along with two research assistants, but provided no information regarding the test's results. The coding and classification concerns expressed in the five studies were addressed in this study by using the IHEP benchmarks as a more precise coding scheme for content analysis which realized a more consistent categorization of the literature.

Summary of the Five Studies

The purpose of this section was to synthesize the concepts and data found in the five studies to inform the selection of data elements to be collected and analyzed for the current study's evaluation of research in distance education. Through this synthesis, the inclusion of bibliographic data, topic analysis, and identification of research methods is supported by the previous research. The five studies also give additional credence to the selection of *The American Journal of Distance Education*, *Distance Education*, *Journal of Distance Education*, and *Open Learning* as the journals to be reviewed in this study and support their reputation as the primary journals in distance education (Moore & Kearsley, 2005).

The Lee et al. study provided an indication of the purpose and importance that data from a citation analysis can provide to an evaluation of research studies. The authors recognized the value of analyzing reference list information by identifying the authors and publications who have contributed to distance education. The citation data provided researchers and practitioners another data source to inform their study and practice. The citation data provided by Lee et al. only included frequency list of primary authors and publications. This study expanded the citation analysis by utilizing bibliometric methods to include bibliographic coupling and co-citation analysis to provide a more rich data source of the publication relationships and patterns in the field of distance education.

The findings of the five studies for topics and research methods provided a baseline of comparison for this study's content analysis of the same two data elements. Descriptive research had the highest percentage in the category of research method (see

Table 5) which all five studies concluded indicated a lack of theory-based research in distance education. This study paralleled the five studies using quantitative, qualitative, mixed-methods, and descriptive as the research methods categories. The classification categories of topics (see Table 4) relate closely to the IHEP benchmark categories and this study's content analysis using the benchmarks provided a more detailed topic analysis than what was conducted in the five studies which were reviewed.

Summary of Relevant Findings

The IHEP benchmarks and the constructs the benchmarks represent have received considerable attention by researchers in scholarly publications and by the accrediting organizations. The quality standards for distance education in use by higher education institutions, their faculty and staff, and the various accrediting organizations are comparable to the criteria found in the IHEP benchmarks. A demonstrated example was the *Best Practices for Electronically Offered Degree and Certificate Programs* (Middle States Commission on Higher Education, 2002) adopted by the eight regional accrediting organizations.

The need to identify the "who" and "what" in the context of the systems framework for benchmarks returns to the need to know if researchers have continued to contribute to the knowledge and practice of quality in distance and fill in the research gaps (Moore, 2003; IHEP, 1999, 2000). Who are the primary researchers in distance education, what are they researching, and what are the needs for further research? Previous studies give integrity to this study's selection of research articles reported from 2002 to 2006 in *The American Journal of Distance Education*, the *Journal of Distance*

Education, *Open Learning*, and *Distance Education*. Moore (2004) urges authors and student writers to give precedence to these four journals and supported the study of leading researchers in various disciplines. For example, Moore (2004) stated, "...can you imagine, an article that claims to deal with a question about self-direction in learning at a distance that had no reference to Garrison..." (p. 129).

A study by Clarke, Butler, Schmidt-Hanson, and Somerville (2004) noted poor quality in distance education courses. Clarke, et al. (2004) supported fellow scholars' (Compora, 2003; Moore & Kearsley, 2005) systems model philosophy and concluded the need for quality in each subsystem to ensure total program quality. The study of individual benchmark categories or benchmarks does have merit. However, quality in distance education should take into account the interactions between system components. Distance education may be of poor quality when higher education takes a reductionist approach as opposed to systems thinking (Saba, 2005).

The current study provided a means to inform both of Compora's (2000) suggestions for linking practice with theory and the need for further research in the subsystems of distance education. The lack of attention to scholarly literature could be the result of not knowing what scholarly literature exists for the components of distance education, in whole or part. The bibliometric analysis identified the scholarly literature and the connections between the literature to inform research and practice in distance education within the systems framework of the IHEP benchmark categories and benchmarks. The content analysis of distance education may provide an indication of what systems or subsystems, in the form of IHEP benchmarks, need further research. Content analysis and bibliometrics were the two methods detailed in the next chapter to

collect and analyze the data for the purpose of evaluating the distance education literature.

CHAPTER III

Methods

Introduction

The need to analyze the recent distance education literature supports this study's purpose of determining if researchers are continuing to study the Institute for Higher Education Policy's (IHEP, 2000) benchmarks. An equally important purpose was to identify the publications, authors, and citation patterns that have contributed to research in distance education. Content analysis and bibliometrics were the methods employed to collect data and analyze the distance education literature based on the IHEP's premises of what constitutes quality in distance education. These methods were selected in the judgment of the author to provide the data that will answer or illuminate the research questions posed in Chapter I (Patton, 2002). Specifically, this study was guided by the following research questions:

General question:

> To what extent have the IHEP benchmarks from 2000 guided recent distance education research, what relationships among the research publications did the bibliometric methods identify, and how did the results improve distance education research?

Specific questions:

The following questions guided the content analysis part of the study:

1. Which IHEP benchmarks were reiterated in the research literature and at what frequency?
2. What new benchmarks were identified in the research literature?

The following questions guided the bibliometrics part of the study:

1. Which citing authors were the primary contributors to the research?
2. Which authors received the highest frequency of citations?
3. What type of organizational affiliations do the citing authors represent?
4. What research methods were reflected in the literature?
5. What benchmark category and research methodology differences were found between the four journals which comprised the citing references?
6. What journal publications were cited with the highest frequency?
7. What journal article titles were cited with the highest frequency?
8. What book titles were cited with the highest frequency?
9. What type of publication was cited with the highest frequency?
10. What bibliographic coupling relationships or patterns exist among the literature?
11. What co-citation analysis relationships or patterns exist among the literature?

The IHEP (2000) identified the rapid growth of distance education where institutions "…rushed to connect to the Internet" (p. 1) as the reason for their study. The rush to the Internet by higher education has occurred and will continue to accelerate. The advancements in technology and the use of new technologies by higher education, since

the IHEP report was published, have had a tremendous impact on Internet-based distance education in higher education. The statistics found in Chapter I highlighted the growth in distance education. Rapid growth in distance education use by higher education will continue along the continuum from individual courses to entire degree programs. The IHEP developed the initial list of 45 benchmarks based on their literature review which consisted of 26 selected references. The final 24 benchmarks were based on surveys and interviews conducted at six institutions of higher education. The research in distance education has expanded along with the expansion of online courses and programs. Therefore, this study used the initial 45 IHEP benchmarks given the small sample of institutions surveyed by the IHEP and the rapid growth of distance education.

The continued evaluation of the literature since the IHEP published the 2000 report is warranted to inform and guide current research and practice. Written publications are the primary method for researchers to share knowledge with other scholars and the public. "Research is complete only when the results are shared with the scientific community" (American Psychological Association, 2001, p. 3). Content analysis and bibliometrics provided the researcher two tools to analyze the written discussions and testimonies among researchers. The growth and changes in technology and the Internet, as well as their influence on education, indicated a potentially rich source of recent literature to be analyzed.

This chapter is divided into six sections to discuss the methods and design selected to answer these questions.

Section 1: Selection and summary of the literature sample

Section II: Microsoft Access® database to collect information

Section III: Content analysis procedures

Section IV: Bibliometric procedures

Section V: Data analysis

Section VI: Summary

An overview of this study's methods process is provided in Table 6 and serves as a guide for the specific details of the process found in subsequent sections of this chapter.

Table 6

Summary of Study's Methods Process

Step	Action
1	Literature sample selected 2002 - 2006 AJDE, JDE, DE, OL 278 articles
2	Created Microsoft Access® Database Purpose: Collect content analysis and bibliometric data
3*	Article read (278) Identify content analysis and bibliographic data for citing article & Article coded per IHEP benchmarks
3a	Entered data into database
4	Citations (7,754) Count citations (x) in article reference list Duplicate citing article database record (x) times
4a	Citation bibliographic data entered into database
5	Microsoft Access® Database Records menu option Filter and sort functions
5a	Calculate frequencies based on research questions
6	Microsoft Excel® Spreadsheet Import citation database Data menu option Sort, filter, and subtotal functions
6a	Calculate bibliographic coupling data
6b	Calculate co-citation data

Note*: Steps 3 – 4a were completed in sequence for each of the 278 citing articles which generated the 7,754 citations prior to performing steps 5, 5a, 6, 6a, and 6b.

AJDE: *The American Journal of Distance Education*, JDE: *Journal of Distance Education,* DE: *Distance Education*, OL: *Open Learning*

Selection and Summary of the Literature Sample

The initial step in the data collection process was the selection of literature to inform this study's research questions. The justification for the selection of literature to be analyzed was identified in Chapters I and II. Chapter I identified "the four principal distance education journals" (Moore & Kearsley, 2005, p. 237) as *The American Journal of Distance Education*, the *Journal of Distance Education*, *Open Learning*, and *Distance Education*. Chapter II provided a summary of the previous literature that used these peer reviewed journals as the sample for their evaluation of the distance education literature (Anglin & Morrison, 2000; Berge & Mrozowski, 2001; Koble & Bunker, 1997; Lee et al., 2004; Rourke & Szabo, 2002). The analysis included articles published in the journals for the time period 2002 through 2006. The analysis excluded editorials, book reviews, interviews, and commentaries. Therefore, selection of the four journals was based on the following criteria and parameters: (a) prominence and credibility within the distance education research community, (b) used as the literature sample in previous reviews of distance education literature, and (c) reflected the past five years of publications providing a broad sample since the 2000 IHEP report was published given that 2000 and 2001 provided time for researchers to analyze, evaluate and publish their research. The number of journals by title, publication year, volume, and issue number is found in Table 7.

Table 7

Literature Sample: Number of Journals by Title and Publication Year

Year	Journal Title Volume (Issue numbers) Number of Articles AJDE	JDE	DE	OL	Total (year)
2002	Vol 16 (1-4) 12	Vol 17 (1-3) 16	Vol 23 (1-2) 11	Vol 17 (1-3) 15	54
2003	Vol 17 (1-4) 12	Vol 18 (1-2) 6	Vol 24 (1-2) 14	Vol 18 (1-3) 14	46
2004	Vol 18 (1-4) 13	Vol 19 (1-2) 9	Vol 25 (1-2) 13	Vol 19 (1-3) 21	56
2005	Vol 19 (1-4) 13	Vol 20 (1-2) 8	Vol 26 (1-3) 20	Vol 20 (1-3) 19	60
2006	Vol 20 (1-4) 12	Vol 21 (1-2) 11	Vol 27 (1-3) 21	Vol 21 (1-3) 18	62
Total (journal)	62	50*	79	87	278 total articles

Note*: does not include 12 French language articles published in JDE during this time period.
AJDE: *The American Journal of Distance Education* JDE: *Journal of Distance Education*
DE: *Distance Education* OL: *Open Learning*

All 278 articles were read, coded, and analyzed to generate the data considered necessary to answer this study's research questions. A Microsoft Access® database was created to collect data from the sample of 278 journal articles.

Microsoft Access® Database

The database was designed to collect data for both the content analysis and bibliometric methods used in this study. Database elements were created to input journal article citation characteristics, content analysis coding, and journal article citation reference list. The database was divided into two major sections, citing reference and cited reference to organize content analysis and bibliometric data collection. The citing references are from articles in the four journals included in this study's literature sample.

The cited references are the documents reflected in the citing journal's reference list. A data input form using the Microsoft Access® Database "form view" option was created to ease data entry. Tab selections representing the benchmark categories permitted use of one form to track benchmarks as part of the content analysis for the citing references (see Figures 4 through 11).

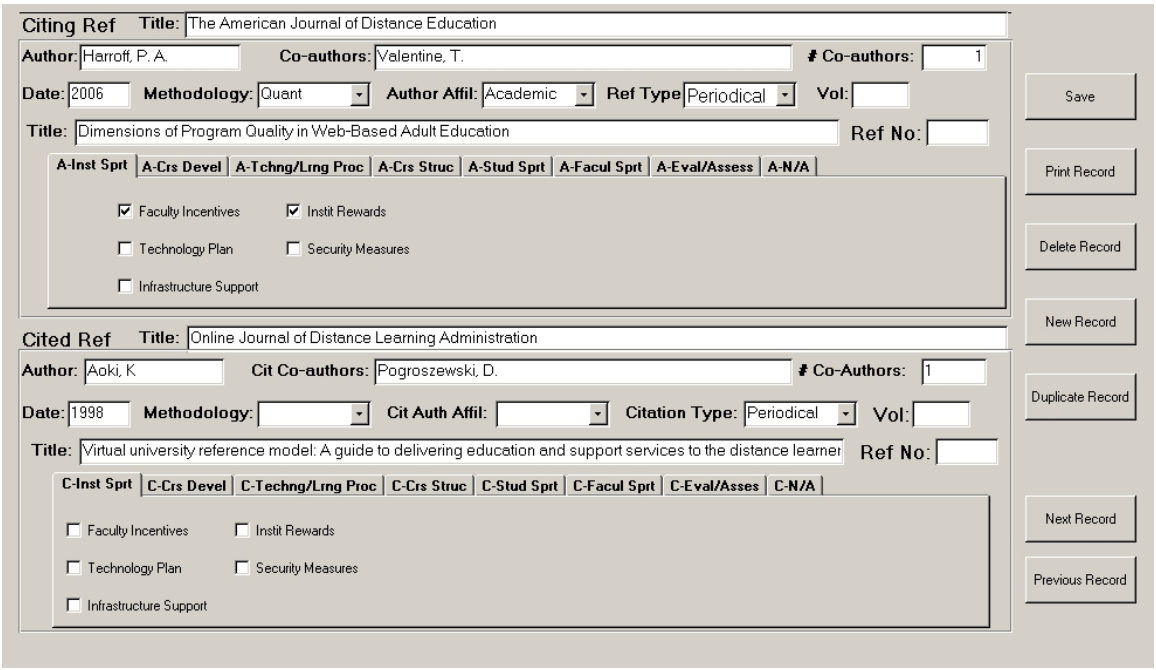


Figure 4. Database input form with Institutional Support category benchmarks

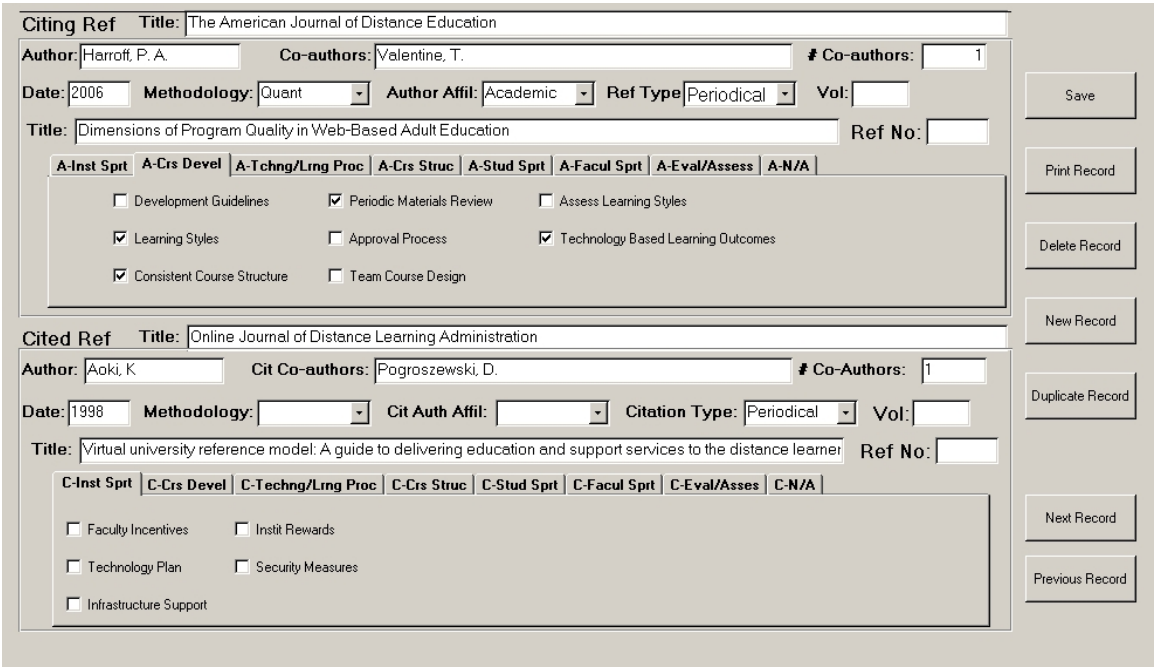


Figure 5. Database input form with Course Development category benchmarks

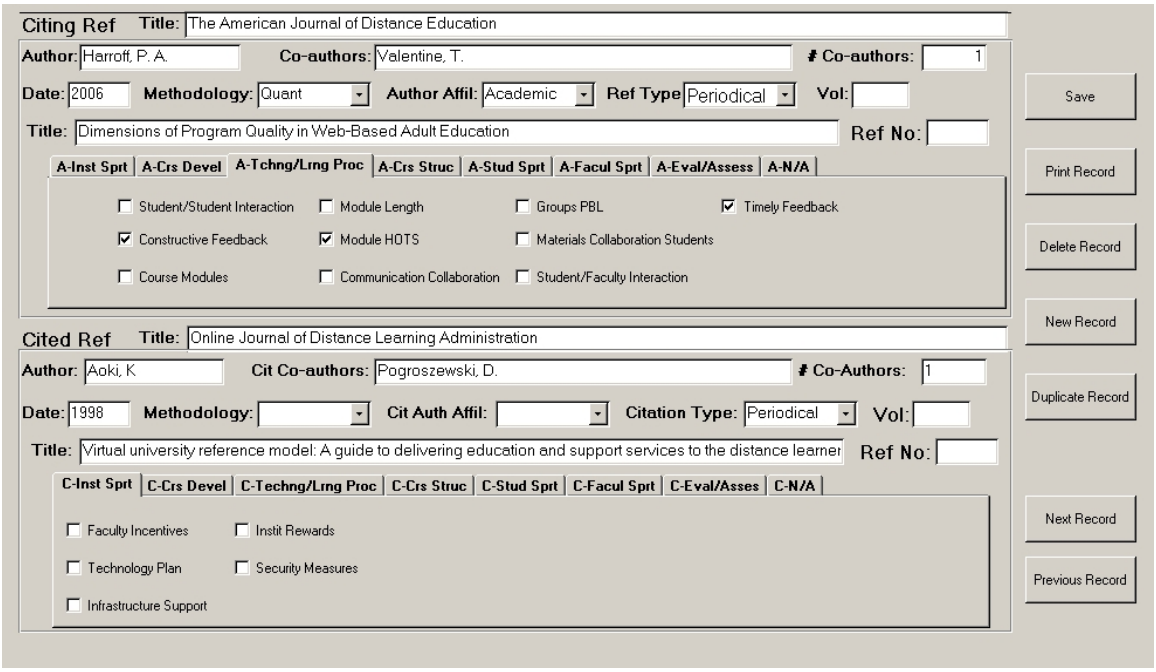


Figure 6. Database input form with Teaching/Learning category benchmarks

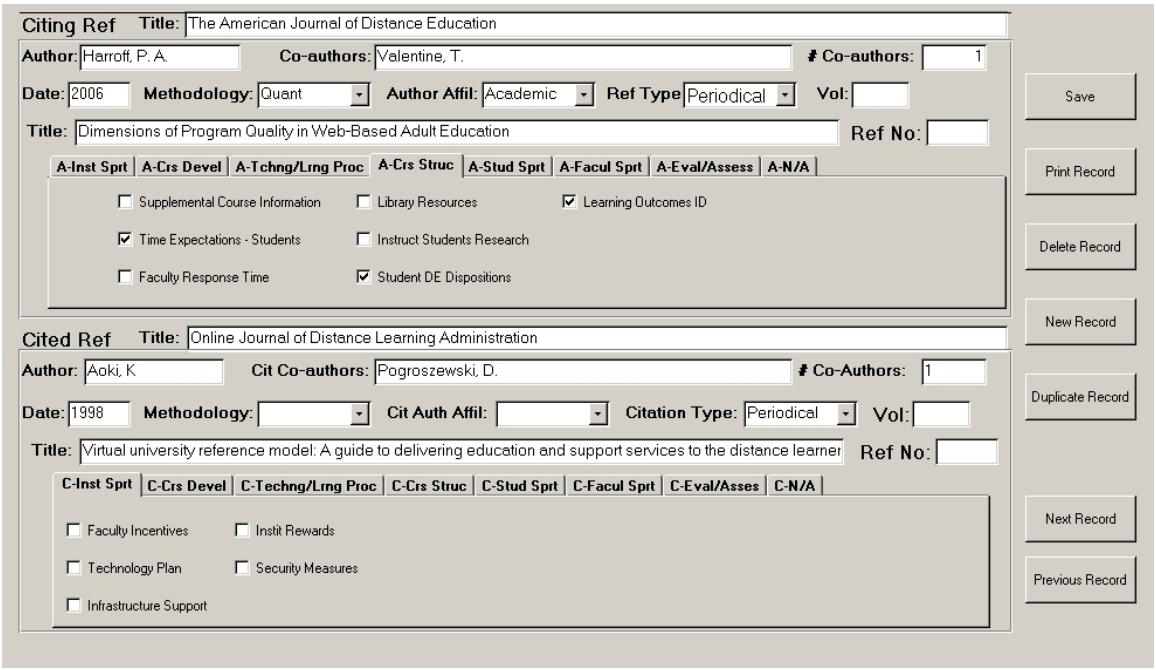


Figure 7. Database input form with Course Structure category benchmarks

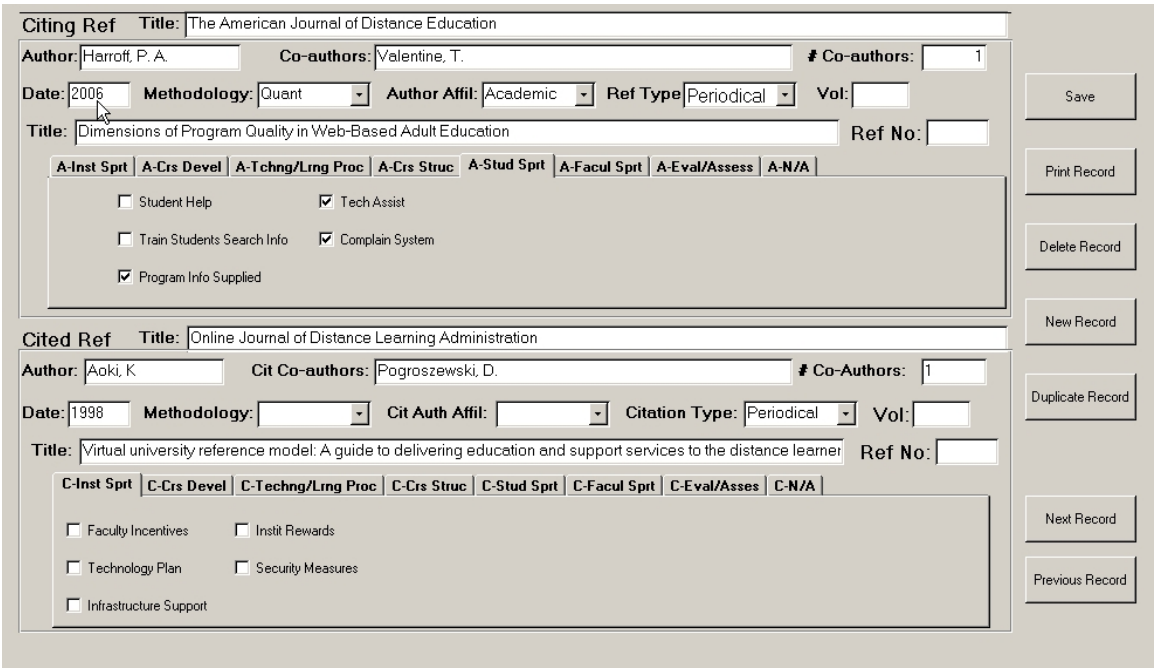


Figure 8. Database input form with Student Support category benchmarks

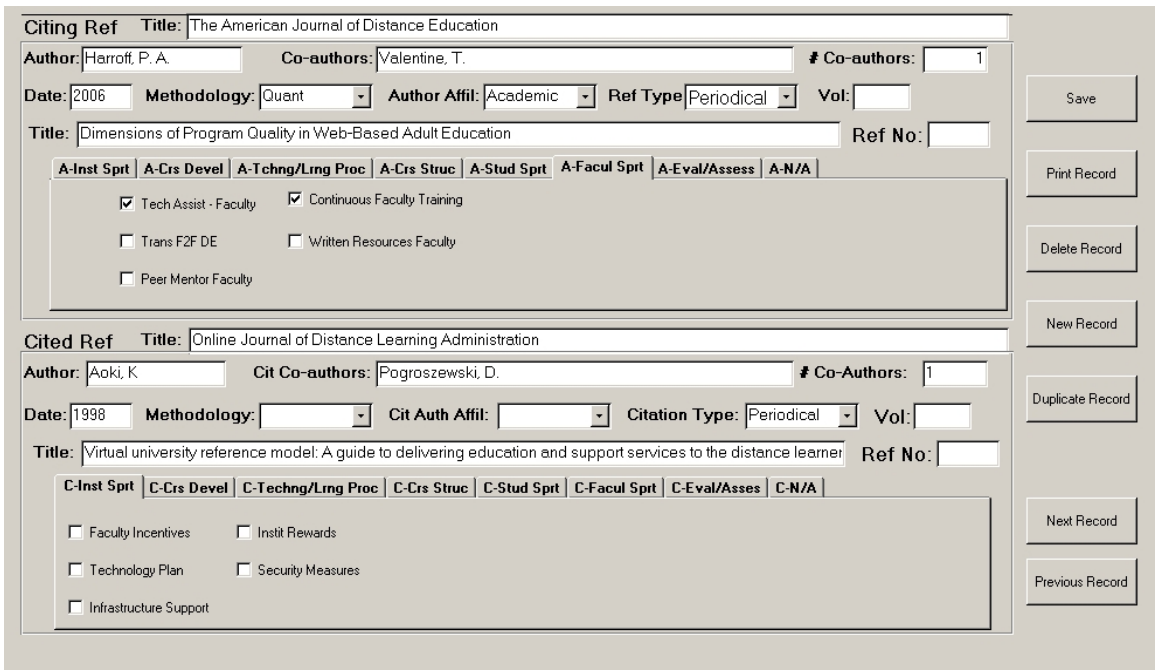


Figure 9. Database input form with Faculty Support category benchmarks

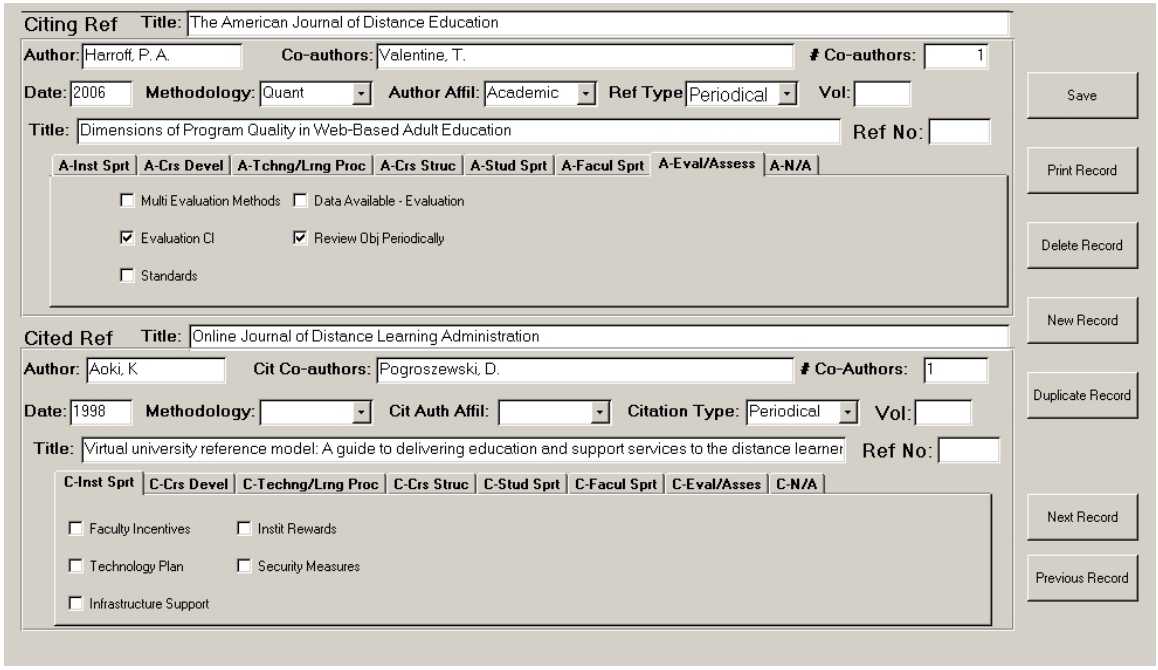


Figure 10. Database input form with Evaluation/Assessment category benchmarks

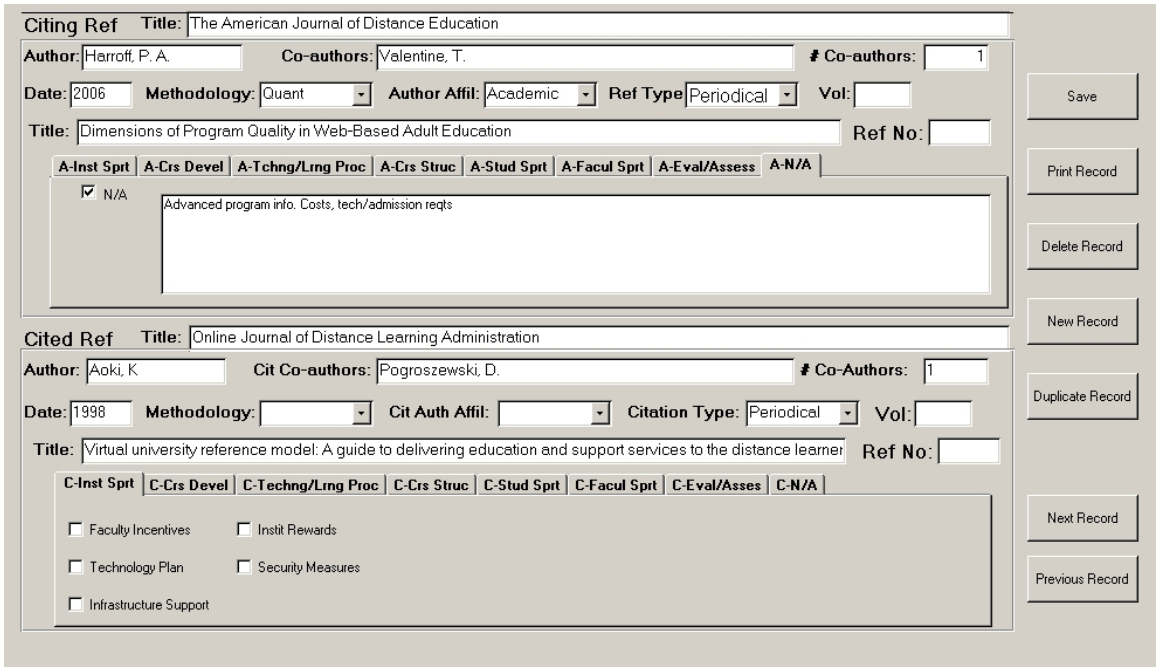


Figure 11. Database input form for Other, Non-applicable (N/A) entries

Specific data elements and data element descriptions for the citing references that comprise the database are as follows. The citing references are the 278 articles from the four journals selected as the literature sample for this study.

Citing references:

Title: *The American Journal of Distance Education*, *Journal of Distance Education, Distance Education, and Open Learning*.

Author: Primary author of the journal article.

Co-Authors: Secondary author or authors of the journal article.

Co-Authors: Number of secondary author or authors of the journal article.

Date: Year of journal article publication.

Methodology: Research methodology used by authors. Quantitative, qualitative, mixed, and descriptive were the coding choices established for this study and database input was facilitated with drop-down menus.

Author Affiliation: The primary author's organization. Academic, non-academic, and government were coding choices established for the study and database input was facilitated with drop-down menus.

Reference Type: Coding scheme was based on type of reference classification found in the *Publication Manual of the American Psychological Association*, 5th edition (2001). Periodical, book, technical/research report, electronic media, unpublished, dissertation, and other were coding choices established for this study and database input was facilitated with drop-down menus. Although periodical was the only choice for this study's sample of citing journal articles, the other categories were included to permit use of the database in future research by the author.

Volume: Journal article volume number.

Reference Number: Journal article issue number associated with a particular volume.

Citing Reference Title: Complete title of journal article.

IHEP benchmark categories and benchmarks: The database input form was created with tab options reflecting the benchmark categories. Selection of a benchmark category tab provided access to the particular benchmarks within the benchmark category. The benchmark category selection and benchmark input data fields provided a mechanism for recording the results of the content analysis. Details of the content analysis method will be provided later in this chapter; however, benchmark input data fields were created for the original 45 IHEP benchmarks. An additional tab was created for "not applicable (N/A)" to input new benchmarks in text format that were discovered during content analysis of the literature sample. Short nomenclatures were developed for the 45 IHEP benchmarks to conserve space and keep the database form to a single page. Benchmark category tabs and short nomenclatures for benchmarks are as follows:

- Institutional Support – Faculty incentives, technology plan, infrastructure support, institutional rewards, and security measures.
- Course Development – Development guidelines, learning styles, consistent course structure, periodic materials review, approval process, team course design, assess learning styles, technology based learning outcomes.
- Teaching/Learning Process – Student/student interaction, constructive feedback, course modules, module length, module HOTS (higher order thinking skills), communication collaboration, groups PBL (problem-based

learning), materials collaboration students, student/faculty interaction, and timely feedback.

- Course Structure – Supplemental course information, time expectations students, faculty response time, library resources, instruct students research, student DE (distance education) dispositions, and learning outcomes ID (identified).
- Student Support – Student help, train students search info, program info supplied, tech assist, and complain system.
- Faculty Support – Tech assist faculty, Trans F2F DE (transition face-to-face distance education), peer mentor faculty, continuous faculty training, written resources faculty.
- Evaluation/Assessment – Multi evaluation methods, evaluation CI (continuous improvement), standards, data available evaluation, review obj (objectives) periodically.
- N/A (not applicable)

Specific data elements and data element descriptions for the cited that comprise the database are as follows:

Cited references:

Cited Reference Title: Title of referenced work

Author: Primary author of referenced work

Cited Co-authors: Secondary author or authors of the referenced work.

Co-Authors: Number of secondary author or authors of the referenced work.

Date: Year of referenced work publication.

Methodology: Research methodology used by the citing authors. Quantitative, qualitative, mixed, and descriptive were the coding choices and database input is facilitated with drop-down menus. Methodology of cited references was not collected in this study, but the option was included to permit use of the database in future research by the author.

Author Affiliation: Primary author's organization. Academic, non-academic, and government were the coding choices and database input is facilitated with drop-down menus. Author affiliation of cited references was not collected in this study, but the option was included to permit use of the database in future research by the author.

Reference Type: Coding scheme was based on type of reference classification found in the *Publication Manual of the American Psychological Association*, 5th edition (2001). Periodical, book, technical/research report, electronic media, unpublished, dissertation, and other were coding choices established for this study and database input was facilitated with drop-down menus.

Volume: Journal article volume, if referenced work was a journal.

Reference Number: Journal article issue number associated with a particular volume.

Title: Title of article or chapter. This field was also used to identify cited references as conference papers or presentations, Educational Resources Information Center (ERIC) document identification, uniform resource locator (URL), or other information to further identify the cited reference.

IHEP benchmark categories and benchmarks: The identical database input format created for the citing references was created for the cited references. IHEP benchmark

information was not collected for cited references, but the option was included to permit use of the database in future research by the author.

Special selection choices were created along the right-hand side of the database input form. Save, print record, delete record, new record, duplicate record, next record, and previous record were the selections created. Although these selections duplicate the functionality of the standard Microsoft Access® Database menu selections, less keyboard or mouse actions were required using the special selections created on the input form. An example would be the entry of the reference list information. Once the information was entered for the citing reference, the duplicate button could be initiated by a single mouse-click and repeated for the number of cited references found in the reference list. The duplication action ensured the database record for cited references were associated with the corresponding citing document.

Content Analysis

The use of content analysis was intended to answer the following specific research questions identified in this study:

1. Which IHEP benchmarks were reiterated in the research literature and at what frequency?
2. What new benchmarks were identified in the literature?

Neuendorf's (2002) description of the goal of content analysis matches the purpose of the three preceding research questions, "A content analysis has as its goal a numerically based summary of a chosen message set" (p. 14). This study's content analysis provided a numerical summary of the four journals' articles for the period 2002 through 2006 (message set) to answer the three research questions related to IHEP benchmarks.

The method used in this study followed an adaptation of the content analysis framework provided by Krippendorff (2004) and the content analysis process provided by Neuendorf (2002). This study's method of content analysis was conducted according to the following stages:

- Theory and rationale
- Conceptualization and context
- Analytical constructs/Operationalizations
- Coding
- Recording and Tabulation
- Inferences and trends

Theory and Rationale

Neuendorff's (2002) requirements for theory and rationale related directly to this study's statement of problem, purpose, research questions, theoretical framework, and significance of study. Research questions are a component of Krippendorff's (2004) framework. The discussion found in Chapter I is considered the important first step to conduct a content analysis. According to Neuendorff the following questions must also be answered during the theory and rationale stage (p. 50):

1. What content will be examined?

2. Will an integrative model be used to link content analysis with other data?

The distance education literature review found in Chapter II provided a partial answer to the first question. The specific content examined were the journal articles found in The

American Journal of Distance Education, *Open Learning*, *Distance Education*, and the *Journal of Distance Education* from 2002 through 2006.

The integrative model provided a linkage to this study's bibliometric analysis. Neuendorff (2002) described the integrative model as "collation of content analysis message-level data with other available empirical information regarding source, receiver, channel, or other contextual states" (p. 61). Empirical information regarding authors (source), receiver (intended audience of reference), and channel (referenced publication) were possible data sets to be generated from the bibliometric analysis.

Conceptualization and Context

Neuendorff (2002) related conceptualization to definitions and variables associated to the construct under study. Krippendorff (2004) considered context to be "the analyst's choice within which to make sense of the body of text" (p. 30). Quality in Internet-based distance education in higher education based on the IHEP benchmarks established the context of this study. Chapter I provided conceptual definitions for the terms Internet, distance education, higher education, and benchmark.

Analytical Constructs/Operationalizations

The analytical construct operationalizes the context (Krippendorff, 2004). Operationalizations according to Neuendorff (2002) are measures and answer the question, "What unit of data collection will you use?" (p. 50). Neuendorff made a distinction between units of data collection and units of analysis. His definition for unit of analysis provided the best fit for this study: "The unit of analysis is the element on which

data are analyzed and for which findings are reported" (p. 13). For this study, the IHEP benchmarks operationalized quality in Internet-based distance education in higher education and serve as the unit of analysis. Weber (1990) considered themes as an acceptable unit of analysis to classify texts. The 45 original IHEP benchmarks served as the data collection themes.

Coding

The 45 IHEP benchmarks are the contents of the codebook and reflect the coding scheme in Neuendorff's (2002) process. Each of the 45 benchmarks was listed under their assigned benchmark category and numbered consecutively from 1 to 45.

The 278 journal articles in the literature sample were read by the author in their entirety. Paper copies of the journal articles were used to permit the author to annotate coding on the paper pages as the article was read. Journal content was marked with the appropriate benchmark number or numbers where content reflected a benchmark theme. Coding rules were established so an individual benchmark would apply only once to a given article. Frequency of an individual benchmark within a single article was not part of the data collection. The intent of the content analysis was to identify which articles contain material relevant to a particular benchmark or benchmarks. The author was the sole coder of the journal articles so there are no inter-rater reliability data to report.

Recording

Coding of the journal articles was entered into the Microsoft Access® database. The appropriate benchmark box on the database input form (see Figures 4-11) was

checked when that particular benchmark had been discovered during reading of the article. Journal articles that generated new benchmarks, in the author's opinion, were entered on the database input form under the Other, Non-applicable category.

Inferences, Trends, and Data Analysis

The final stage relates directly to answering this study's research questions, which according to Krippendorff (2004), "…constitute the basic accomplishment of content analysis" (p. 30). Data analysis, findings, and conclusions are found in chapters IV and V of this study.

Bibliometrics

The use of bibliometrics is intended to answer the following specific research questions identified in this study:

1. Which citing authors were the primary contributors to the research?
2. Which authors received the highest frequency of citations?
3. What type of organizational affiliations do the primary authors represent?
4. What research methods were reflected in the literature?
5. What benchmark category and research methodology differences were found between the four journals which comprised the citing references?
6. What journal publications were cited with the highest frequency?
7. What journal article titles were cited with the highest frequency?
8. What book titles were cited with the highest frequency?
9. What type of publication was cited with the highest frequency?

10. What bibliographic coupling relationships and patterns exist among the literature?

11. What co-citation analysis relationships and patterns exist among the literature?

Overview – Bibliometrics

Bibliometrics can be defined as a quantitative method that uses statistics to analyze bibliographic information found in written publications (Borgman, 1990; Holden et al., 2005; Moed, 2005). Broadus (1987) reviewed almost twenty definitions of bibliometrics found in the literature and concluded they were too broad. He concluded his article by proposing the following definition of bibliometrics: "In summary, there does seem to be a clearly delineated body of research involving physical units of publications, bibliographic citations, and surrogates for them. The measurement of these items is called, logically, bibliometrics" (p. 377).

There are numerous bibliometric applications found in the literature to include methods for citation analysis, co-citation analysis, bibliographic coupling, and co-word analysis (Moed, 2005). Osareh (1996) provided a general literature overview of bibliometrics, citation analysis, co-citation analysis, and bibliography coupling. The overview cited numerous definitions of bibliometrics and citation analysis. The common theme among the bibliometric definitions is the application of measurements and statistics to study documents and publications. A few of the definitions mention the study of publication patterns. The study of the relationship between the cited and the cited document was the common theme among citation analysis definitions. Borgman and Furner (2002) stated bibliometrics was concerned "with the measurement specifically of properties of documents" (p. 7). Measurements are frequency counts of document

variables. Citation analysis, co-citation analysis, and bibliometric coupling are the bibliometric methods to be used in this study.

According to Moed (2005), "*Citation analysis* comprises a variety of ways to analyze references cited in scholarly publication" (p. 20). Others have defined citation analysis as a method to rank citations according to the frequency they are cited in the reference and bibliography lists of publications (Waugh & Ruppel, 2004). The method of bibliographic coupling indicates a relationship between two citing documents that have common citations. The strength of the relationship is based on the number of citations the two citing documents have in common. Co-citation indicates a relationship between two citations that are cited in the same citing document. The strength of the relationship is based on the number of citing documents that contain the citations. For example, two citations found in the reference lists of four documents has a stronger co-citation relationship than two citations found only in the reference lists of one, two, or three citing documents. Cited documents are related because they are cited by the same citing document even if they don't cite each other. Figure 12 illustrates bibliographic coupling and co-citation analysis.

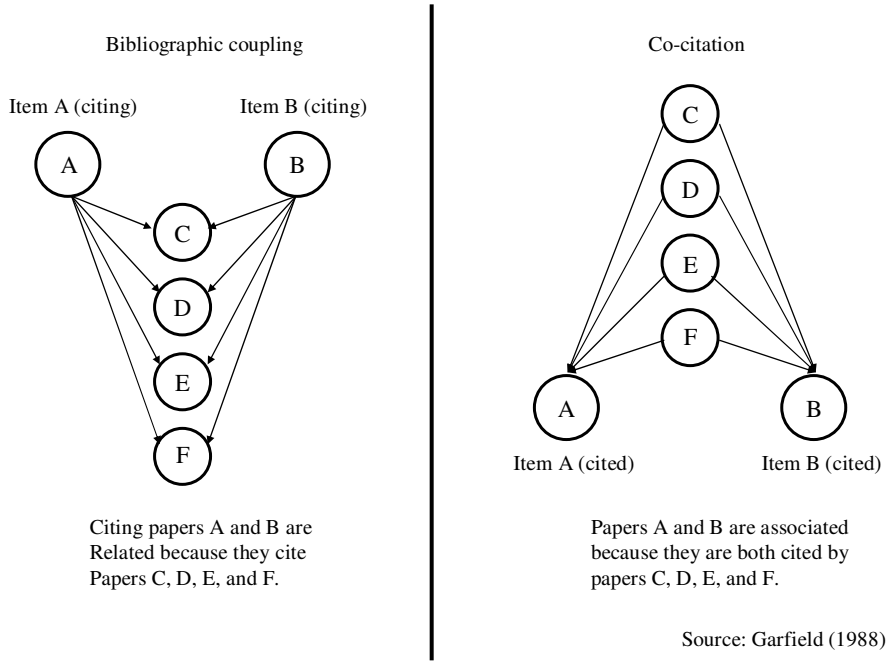


Figure 12. Bibliographic coupling and co-citation analysis

The purpose of the analyses and citation characteristics are important factors when considering the use of bibliometrics as a research method. Frequency of citations, author characteristics, research methodology, and citation attributes are variables to be considered. According to Osareh (1996), "citation analysis can be used to define disciplines and emerging specialties through journal relationships and to determine the interdisciplinary or multidisciplinary character of research programs and projects" (p. 154). The interactions among multiple citation analysis factors could provide valuable data to the author to make inferences concerning the written communications of distance education. Citation patterns may indicate new benchmarks or benchmark categories. Co-citation analysis and bibliographic coupling may reveal connections among authors, nations, journals, and institutions not previously known. Co-citation and bibliographic

coupling could uncover new relationships or patterns in clustering documents related to the benchmarks or benchmark categories identified by the IHEP (2000).

Research methodology may be an important factor to be considered in citation analysis (Chu, 2005; Palmer, Sese, & Montano, 2005; Swyhart-Hobaugh, 2004; Williams & Winston, 2003). Palmer et al. (2005) excluded descriptive studies and limited his citation analysis to quantitative studies and determined the frequencies by type of quantitative method. Swyhart-Hobaugh (2004) concluded in her study of sociology literature that quantitative publications primarily cite quantitative literature, while qualitative publications cite quantitative and qualitative publications. Meho and Haas (2001) used citation analysis as a method to determine how faculty locates information for a particular research purpose.

Many studies lacked rigor or a theory-based perspective (IHEP, 1999; Moore, 2003a). Poor methodology and citing a large percentage of research not based on acceptable methods could affect the validity and reliability of the research. The continued citing of poor quality research by researchers only perpetuates the problem. High citation counts should also not necessarily translate to quality research or researcher status (Paisley, 1990). Determining the use of primary and secondary sources, author's source for citation, and size of citation are other citation characteristics that could be included in the analysis (Wiberley, 2003). Citation analysis can also reveal patterns or clusters based on the factors counted and analyzed. The analysis could determine research trends or patterns in a particular discipline. Such an analysis could strengthen Moore's (2003a) call for more empirical theory-based research in distance education if the citation analysis supported his claim.

Waugh and Ruppel (2004) conducted citation analysis of the graduate student publications within their academic department. The purpose of their research was to provide information to assist their library's efforts to acquire and maintain journals within their academic discipline. The library originally conducted a survey of faculty to rank the importance of serials within the faculty's academic discipline. Waugh and Ruppel suggested limitations in the methodology of using faculty to rank serials as justification to conduct citation analysis of dissertations, theses, and research papers of graduate students. The reference list of graduate student papers was compiled and a list of publications was ranked ordered by frequency of citation. Beile, Boote, and Killingsworth (2004) in a study of education dissertations from three universities concluded there were differences in the currency, scholarliness, and appropriateness of the citations used by the doctoral students.

Age of the citation may also be a factor to be considered (Budd, 1990; Buttlar, 1999; Joswick, 2001; Swyhart-Hobaugh, 2004). Meadows (2005) discussed the "obsolescence" of documents relating to the concept that documents serve half its use "half-life" as citations in the first few years of being published. Different methods can compare citation age at a particular point in time or from a historical or longitudinal perspective. The age of the document was important since a purpose of this study was to compare the results of the IHEP (2000) findings to the literature published since *Quality on the Line: Benchmarks for Success in Internet-based Distance Education* was published.

Many researchers included data on the citation's author or authors to include gender, professional position, and institutional affiliation (Buttlar, 1999; Onyancha &

Ocholla, 2004; Swyhart-Hobaugh, 2004; Williams & Winston, 2003). The Carnegie classification system for higher education can be used to analyze which institutions defined by class and geographical locations are producing research (Williams & Winston, 2003). Author characteristics also can provide an indication of scholars who are contributing outside their primary academic discipline (Wiberley, 2003). Analyzing co-authors may provide author collaboration data such as authors who have a high or low percentage of co-authors or who collaborate with authors outside their discipline. Identifying interdisciplinary relationships among authors, citations, publications may enrich the methodology and provide knowledge of information sources not readily available or known to the researcher.

Moore (2003a) discussed the lack of scholarly research and weak research designs in the field of distance education. Including the citation's research methodology as a factor would appear to have value. Moore specifically criticized the literature review conducted in dissertations and suggested that students should begin the research process by reviewing the citations of the chapter in the *Handbook of Distance Education* (Moore & Anderson, 2003) appropriate to the focus of the student's research interest. Moore considered the reference list "…the starting point for identifying the main body of literature in that area" (p. xi). Citation analysis patterns may also indicate new benchmarks or benchmark categories and further define quality in Internet-based distance education in higher education.

Citing Document and Citation Characteristics

The 278 articles from *The American Journal of Distance Education*, the *Journal of Distance Education*, *Open Learning*, and *Distance Education* are the citing documents and the citations listed in the reference lists of the 278 articles are the cited documents. Citation characteristics were collected from both citing and cited documents unless specifically noted in parentheses. The following citation characteristics were collected from the 278 journal articles and their associated reference lists:

- Document title
- Author and co-authors
- Date of publication
- Methodology (cited document only)
- Author affiliation (cited document only)
- Title of citing document article
- Title of referenced work in cited document
- Reference type
- Volume number and issue

Citation characteristics were previously defined in the Microsoft Access® database section of this chapter. Collection of citation characteristics was documented in the database.

Bibliometrics: Data Analysis

Data for the citing references were collected during the content analysis data collection. Citation characteristics were entered into the Microsoft Access® database for the citing references (see Figures 4-11): *The American Journal of Distance Education*, the *Journal of Distance Education*, *Open Learning*, and *Distance Education*.

The data entry for cited references was accomplished after the specific journal article had been read, coded for content analysis purposes, and the citing reference database elements entered into the database. The next step was to count the number of cited documents contained in the citing journal's reference list. The "duplicate record" button was then used to duplicate the citing journal's database record for the number of cited documents contained in the citing journal's reference list. As previously stated, the duplication action ensured that each reference maintained the connection to the citing document database information.

Citation characteristics for the cited documents in the reference list were then entered into the database. Every reference contained in the citing journal article's reference list was entered into the database. This procedure was performed for the reference lists of the 278 journal articles that comprised this study's literature sample. A total of 7,754 records were generated in the database. The 7,754 records represent the total number of citations found in the reference lists of the 278 journal articles. Figure 13 displays the database architecture for the 278 citing journal articles.

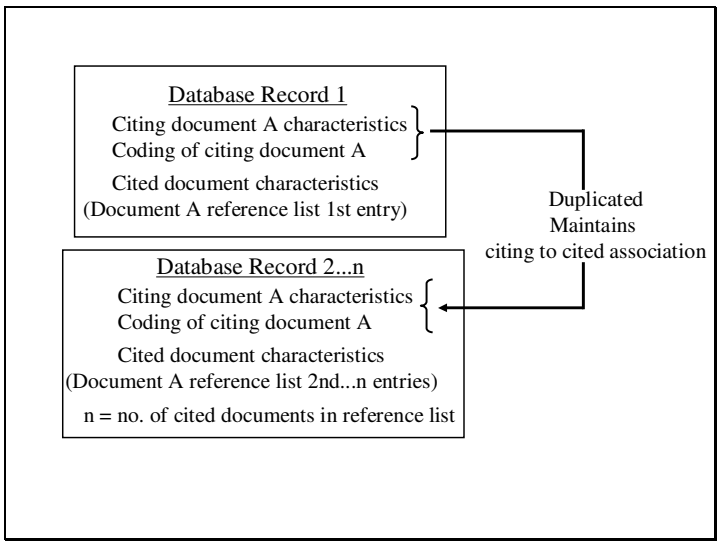


Figure 13. Database architecture

Data Analysis

The Microsoft Access® database provides the tool to analyze data created by the content analysis and bibliometric methods. A second "subset" database was created from the 7,754 records. The subset database consisted of 278 records for the first record of each citing journal article. The "subset" database contains the content analysis data and citation characteristics of the 278 citing journal articles from *The American Journal of Distance Education*, the *Journal of Distance Education*, *Open Learning*, and *Distance Education*. The subset database provides a smaller file size that is easier to manipulate to conduct database sorting and filtering to conduct queries that only require citing journal article information. For example, determining the frequency of citing authors and their organizational affiliations only requires the 278 records for the citing journal article. The subset database provided the data necessary to answer the content analysis research questions and the bibliometric research questions requiring only the citing reference data.

Microsoft Excel® was used in conjunction with Microsoft Access® to calculate the frequencies and bibliometric relationships required to answer this study's research questions. The Microsoft Access® filter and sort functions available from the "records" menu option provided the ability to perform the required frequency calculations. The data necessary to analyze bibliographic coupling and co-citation analysis data was performed by exporting the 7,754 records from Microsoft Access® to Microsoft Excel®. The sort, filter, and subtotal functions available from Microsoft Excel's® "data" menu option provided the ability to perform the required bibliometric calculations and provide another check on the integrity of the frequency data imported from the Microsoft Access® databases.

Bibliometric Data Normalization Procedures and Mapping

Bibliographic coupling and co-citation analysis data calculations generated two sets of data. First, pairs of citing references were identified as coupled due to their sharing common citations. The number of common citations shared by the citing references determined the strength of the coupling relationship. Since citing references contain a different number of citations in their respective reference lists, a method to account for these differences was utilized in this study. A citing reference with a large reference list has a greater chance to be coupled with other documents than a citing reference with fewer number of references. Therefore, Jarneving's (2005) normalization procedures for bibliographic coupling strength to account for reference list length were applied to the data. He defined the normalization formula as (p. 250):

$$CS_{ij} = \frac{r_{ij}}{\sqrt{(r_i * r_j)}}$$ Note: square root

CS_{ij} = coupling strength between paper i and paper j

r_{ij} = the number of references common to both i and j

r_i = the number of references in the reference list of paper i

r_j = the number of references in the reference list of paper j

The normalization formula results are in the interval zero to one with $r_i = r_j = r_{ij}$ indicating the maximum strength with zero indicating no coupling relationship. Jarneving provided no specific statistical ranges for quantifying strength into categories indicating a scale of low to high or weak to strong. Researchers have established categorization along a continuum depending on the research focus or complexity of the data to be analyzed. This study eliminated coupling relationships with only one common citation due to the small coupling strength as defined by the researcher.

Second, co-citation relationships were identified by pairs of citations being cited by common citing documents. The strength of the relationship is based on the number of citing documents that contain the citations. The chance of citations being co-cited increases based on the number of times the citation appears in reference lists of citing documents. Citations contained in a large number of reference lists have a greater chance of being co-cited than citations found in a smaller number of reference lists. Jarneving's (2005) normalization procedures for co-citation strength were used to account for the frequencies of citations found in the reference lists of citing documents. He defined the normalization formula as (p. 251):

$$CS_{ij} = \frac{coc_{ij}}{\sqrt{(cit_i * cit_j)}}$$ note: square root

CS_{ij} = co-citation strength between document i and j

coc_{ij} = the number of co-citations between i and j

cit_i = the number of citations for document i

cit_j = the number of citations for document j

The number of document citations was based on the frequency of the citations found in the reference lists of this study's 278 primary journal articles. The normalization function results are in the interval zero to one with $r_i = r_j = r_{ij}$ indicating the maximum strength with zero indicating no co-citation relationship. Jarneving provided no specific statistical ranges for quantifying co-citationstrength into categories indicating a scale of low to high or weak to strong. Researchers have established categorization along a continuum depending on the research focus or complexity of the data to be analyzed. This study considered co-citation relationships based on one to three common citing documents to be a weak relationship and eliminated these relationships from the analysis as determined by the researcher.

Finally, cluster mapping methods were conducted to provide a graphical representation of the co-citation relationships (Garfield, 1980). The visual representation of the citation links between co-cited documents found in the reference lists of the 278 primary journal articles created a network for the foundation of the recent literature in distance education.

Summary

The use of content analysis and bibliometric methods within the systems model provided for a more robust evaluation of the research and capability to measure the scholarliness of the research publications. The themes of the IHEP benchmarks for content analysis and the analysis of citation indicators for the corresponding literature enabled a synthesis of what knowledge has been created since the publication of the IHEP (1999, 2000) studies. Diane Oblinger eloquently stated one purpose of this study's literature evaluation and put the research into perspective, "…if we implemented what we already know, we'd see huge improvements in learning and student success" (Wheeler, 2006, p. 53). An evaluation and identification of the distance education literature will provide a resource to assist the search for what is known and to identify the needs for further research. Data was evaluated utilizing content analysis and bibliometric methods with the research findings presented in Chapter IV.

CHAPTER IV

Research Findings

Overview

The purpose of this study was to conduct a content analysis of journal articles to determine what 2000 Institute for Higher Education Policy (IHEP) benchmarks were found in the recent distance education literature. The study sought to identify patterns and relationships among the publications and authors that comprised the data for this study. Recent distance education literature was defined as the body of articles found in *The American Journal of Distance Education (AJDE)*, *Journal of Distance Education (JDE)*, *Distance Education (DE)*, and *Open Learning (OL)* for the time period 2002 through 2006. The general research question guiding this was:

> To what extent have the IHEP benchmarks from 2000 guided recent distance education research, what relationships among the research publications did bibliometric methods identify, and how did the results improve distance education research?

Methodology and Procedures

The articles used in this study were from the *American Journal of Distance Education (AJDE)*, *Journal of Distance Education (JDE)*, *Distance Education (DE)*, and

Open Learning (OL) covered the time period 2002 through 2006. The researcher reviewed 278 articles, coded articles according to the respective IHEP benchmarks, and entered the resulting data into a Microsoft Access® database. The 278 journal articles produced 7,754 citations which were entered into a database. Additional bibliographical information for the 278 primary journal articles and 7,754 citations were entered into the database. Microsoft Access® database and Microsoft Excel® spreadsheet tools provided data analysis to answer specific content analysis and bibliometric method research questions.

Content Analysis Research Question 1: Which IHEP benchmarks were reiterated in the research literature and at what frequency?

An individual benchmark was coded only once for a given article; therefore, frequency for Question 1 equals the number of citing articles (278) that addressed the particular benchmark (see Table 8).

Table 8

Frequency of IHEP Benchmarks Found in the Research Literature

Rank	Benchmark Number*	Benchmark*	Total Number of Articles Citing the Benchmark (*f*)	% 278 Citing Articles
1	14	Student/faculty interaction	186	66.91%
2	15	Student/student interaction	170	61.15%
3	21	Communication collaboration	112	40.29%
4	41	Multiple evaluation methods	77	27.70%
5	23	Materials collaboration students	64	23.02%
6	17	Constructive feedback	62	22.30%
7	22	Groups problem-based learning	59	21.22%
8	16	Timely feedback	50	17.99%
9	42	Evaluation – continuous improvement	46	16.55%
10	25	Time expectations - students	44	15.83%
11	24	Supplemental course information	42	15.11%
12	29	Student distance education dispositions	32	11.51%
13	9	Learning styles	31	11.15%
13	27	Library resources	31	11.15%
13	37	Transition face-to-face to distance ed	31	11.15%
16	20	Module Higher Order Thinking Skills	29	10.43%
17	31	Student help	27	9.71%
18	12	Technology based learning outcomes	24	8.63%
18	30	Learning outcomes identified	24	8.63%
20	34	Technical assistance	23	8.27%
21	33	Program info supplied	22	7.91%
22	8	Team course design	21	7.55%
22	36	Technical assistance - faculty	21	7.55%
24	39	Continuous faculty training	17	6.12%
25	1	Faculty incentives	15	5.40%
25	5	Infrastructure support	15	5.40%
25	18	Course modules	15	5.40%
25	32	Train students search info	15	5.40%
29	10	Assess learning styles	14	5.04%
30	7	Development guidelines	13	4.68%
31	2	Institutional rewards	12	4.32%
31	28	Instruct students research	12	4.32%
33	19	Module length	11	3.96%
34	11	Consistent course curriculum	10	3.60%
34	38	Peer mentor faculty	10	3.60%
36	45	Review objectives periodically	9	3.24%
37	43	Standards	8	2.88%

Rank	Benchmark Number*	Benchmark*	Total Number of Articles Citing the Benchmark (*f*)	% 278 Citing Articles
38	26	Faculty response time	7	2.52%
38	40	Written resources faculty	7	2.52%
40	3	Technology plan	6	2.16%
40	44	Data available - evaluation	6	2.16%
42	4	Security measures	5	1.80%
43	13	Periodic materials review	4	1.44%
44	6	Approval process	3	1.08%
44	35	Complaint system	3	1.08%
Total occurrences of benchmarks reiterated in the literature			1,445	

Note*: See Appendix A for benchmarks numbers and a full description of the benchmark.

The benchmarks listed in Table 8 were grouped by their respective benchmark category and reported by frequency (see Table 9). The content analysis revealed that over half (52.46%) of the benchmark findings were classified in the teaching/learning category. This result was expected since the top three ranked benchmarks related to interaction and collaboration are within the teaching/learning category (see Table 8).

Table 9

Frequency of IHEP Benchmark Categories Found in the Research Literature

Rank	Benchmark Category	Total Number of Benchmarks by Category Cited in Articles (*f*)	% of Total Number of Benchmarks Cited in Articles
1	Teaching/Learning Process	758	52.46%
2	Course Structure	192	13.29%
3	Evaluation and Assessment	146	10.10%
4	Course Development	120	8.30%
5	Student Support	90	6.23%
6	Faculty Support	86	5.95%
7	Institutional Support	53	3.67%
Total occurrences of benchmarks reiterated in the literature		1,445	100%

Content Analysis Research Question 2: What new benchmarks were identified in the research literature?

Reading and subsequent coding of the 278 articles revealed new benchmarks that did not fit the description of one of the 45 existing benchmarks (see Table 10). Frequency rules for new benchmark coding followed the same coding rules as content analysis conducted for Question 1 for existing benchmarks. A new benchmark was coded only once when referenced by a given article; therefore the frequency noted in Question 2 represents the number of times the new benchmark was cited in the 278 articles.

Table 10

Frequency of New IHEP Benchmarks Found in the Research Literature

Rank (*f*)	New Benchmark	*f*	% 278 Citing Article
1	Pre-orientation (computer skills, course management system navigation, post syllabus prior to course start)	43	15.47%
2	Learner-content interaction in variety of ways	29	10.43%
3	Expand student communication modes (course management systems, two-way video, web-cam)	13	4.68%
3	Course design and materials promote a constructivist, learner-centered environment	13	4.68%
5	Content organized by learning objects	12	4.32%
6	Courses/modules promote critical thinking	11	3.96%
7	Establish course/program learning community via online communities of practice	6	2.16%
7	Accessibility issues, section 508 compliance	6	2.16%
9	Policy for intellectual property rights	3	1.08%
9	Online academic counseling/advisement	3	1.08%
9	Consideration for cultural differences	3	1.08%
12	Accredited program	2	0.72%
12	Maximum student/faculty ratio	2	0.72%
12	Multiple course content delivery options (online & print)	2	0.72%

Bibliometrics Research Question 1: Which citing authors were the primary contributors to the research?

A review of the authors for the set of 278 articles revealed that two authors were responsible for contributing five articles. However, the majority of the authors, 221, contributed a single article. Tables 11 and 12 provide information regarding the frequency of contribution of authorship in the 278 articles. Table 11 simply provides an overview of how many articles the authors had published in the journals under review for the time period 2002 to 2006 for the purposes of this study. Table 12 identifies the authors by name who published more than two articles, the journals in which the publications occurred, and the total number of articles.

Table 11

Frequency of Citing Author Contributions

Number of Articles	Number of Authors
1	221
2	18
3	1
4	2
5	2

Table 12

Frequency of the Top Five Citing Authors by Journal

Author	Number of Articles Contributed				
	AJDE	JDE	DE	OL	Total
Conrad, D.	1	2	1	1	5
Kanuka, H.	1	1	2	1	5
Fahy, P.J	2	2	0	0	4
Jeong, A.	2	1	1	0	4
Zhang, W.	0	0	1	2	3

AJDE: *The American Journal of Distance Education;* JDE: *Journal of Distance Education;* DE: *Distance Education*; OL: *Open Learning*

Bibliometrics Research Question 2: Which authors received the highest frequency of citations?

The 278 articles chosen for this study were also reviewed to determine which authors' works were referenced as a basis for newer studies. Within the body of articles, 7,754 citations were noted. Evident to the researcher through over seven thousand citations, several authors' work emerged as the most referenced. Table 13 provides the data for the authors who were cited more than 25 times. Noteworthy, is that M.G. Moore was cited over 100 times. The five authors with the most citations were: M.G. Moore (105 citations), D. R. Garrison (76 citations), D. H. Jonassen (55 citations), C. N. Gunawardena (52 citations), and L. Rourke (41 citations).

Table 13

Frequency of the Top Cited Authors (more than 25 citations)

Rank	Author	Citations Received
1	Moore, M.G.	105
2	Garrison, D.R.	76
3	Jonassen, D.H.	55
4	Gunawardena, C.N.	53
5	Rourke, L.	41
6	Berge, Z.L.	35
7	Anderson, T.D.	34
8	Mason, R.D.	33
9	Bates, A.W.	31
10	Harasim, L.M.	31
11	Hiltz, S.R.	29
11	Kember, D.	29
13	Henri, F.	28
13	Kanuka, H.	28
13	Vygotsky, L.S.	28
16	Collis, B.	27
16	Fahy, P.J.	27

Bibliometrics Research Question 3: What type of organizational affiliations do the citing authors represent?

Citing authors for the 278 journal articles were categorized according to one of the following three categories: academic, non-academic, or government (see Table 14). Knowing the organizational affiliation of an author provides the reader with an understanding of the possible biases that may be evident in the author's conclusions. The organizational affiliations were classified as academic, non-academic, or governmental since these three seem to represent the major entities involved in distance education. Table 14 provides the number of authors representing each type of organization and the percentage of the total organizational distinction.

Table 14

Frequency of Citing Authors by Organizational Affiliation

Organizational Affiliation Category	Number of Authors by Category	Number of Authors by Category (%)
Academic	265	95.30%
Non-Academic	11	4.00%
Government	2	0.70%
Total articles	278	100%

Bibliometrics Research Question 4: What research methods were reflected in the literature?

Research methodology is perhaps the most important distinguishing characteristic of a journal article. For the purposes of this research study, four primary methodologies were identified: quantitative, qualitative, mixed methods, and descriptive. Table 15 provides data regarding the number of articles reflecting each of the four methods.

Classification of research methodology was determined first by reviewing the article for a methods or methodology section. The articles stated methodology was then used for this study's research methodology classification. If the article did not provide specific research methodology information, the researcher made the classification decision based on the reading of the entire article.

Table 15

Frequency of Research Methods for Citing Journal Articles

Research Method Category	Number of Articles	Number of Articles (%)
Quantitative	88	31.70%
Qualitative	68	24.40%
Mixed method	37	13.30%
Descriptive	85	30.60%
Total articles	278	100%

Bibliometrics Research Question 5: What benchmark category and research methodology differences were found between the four journals which comprised the citing references?

The researcher decided that differences pertaining to benchmark and research methodology findings among the four journals would provide the most valuable information for future research. Differences among the four citing journal articles were based on the number of IHEP benchmarks by category according to citing journal (see Table 16) and the research methods utilized by the citing journals (see Table 17). Academic affiliation differences were negligible considering that 95.3 percent of the 278 articles were coded academic (see Table 14). The data found in Tables 16 and 17 are descriptive statistics representing an expansion of the benchmark category data from

Table 9 and the research methodology data from Table 15 into data categorized by the four journals.

Researchers having the view of these differences would have the knowledge to fine-tune their initial literature focus to a particular journal or journals. For example, a researcher interested in conducting a meta-analysis could focus on the journal where the majority of the articles were classified as quantitative. Researchers might also interpret the data to determine the need for additional research. Publishers may want to balance article topics and call for research studies on benchmark categories where a relatively small number of articles exist.

Table 16

Differences –Benchmarks by Category According to Citing Journal

Benchmark Category	AJDE	DE	JDE	OL	Total/category
Institutional Support	18	15	14	6	53
Course Development	39	32	16	33	120
Teaching/Learning Process	176	284	127	171	758
Course Structure	43	63	25	61	192
Student Support	33	16	23	18	90
Faculty Support	17	24	24	21	86
Evaluation/Assessment	23	51	19	53	146
Total benchmarks/Journal	349	485	248	363	1,445
Total Percentages/Journal	24%	34%	17%	25%	100%

AJDE: *The American Journal of Distance Education;* DE: *Distance Education;* JDE: *Journal of Distance Education;* OL: *Open Learning*

Table 17

Differences –Research Methods of the Citing Journals

Journal Title	Descriptive (%)	Mixed (%)	Qualitative (%)	Quantitative (%)	Total (%)
AJDE	23	6	11	60	100
JDE	36	14	34	16	100
DE	24	15	32	29	100
OL	39	16	22	23	100

AJDE: *The American Journal of Distance Education;* JDE: *Journal of Distance Education;* DE: *Distance Education;* OL: *Open Learning*

Bibliometrics Research Question 6: What journal publications were cited with the highest frequency?

The quality of a journal is often related to the number of times articles within that journal are cited in other scholarly works. The importance or influence of the journal, known as the journal impact factor (Diodato, 1994) expresses the journal's contribution to research as citations are the linkage to past works to support, expand, or exemplify an author's viewpoint. Although specific journal impact factor numbers found in the literature were not calculated for this study, the data in Table 18 gives credibility to the selection of the four journals which served as the literature sample for this study.

The 7,754 citations generated by this study's sample of 278 journal articles were sorted by the Microsoft Access® database, exported to Microsoft Excel®, and then filtered using the Microsoft Excel® spreadsheet data function to determine the most cited journals. Table 18 lists the 15 journals that were cited the most by articles in *The American Journal of Distance Education*, *Journal of Distance Education*, *Distance Education*, and *Open Learning* for the time period 2002 through 2006. *The American*

Journal of Distance Education received over 280 citations while *Instructional Science* received only 30 citations over the same period.

Table 18

Frequency of the Top Fifteen Cited Journal Publications

Rank	Journal Title	Number of Citations
1	The American Journal of Distance Education	285
2	Distance Education	183
3	Open Learning	178
4	Journal of Distance Education	139
5	Educational Technology	77
6	Journal of Asynchronous Learning Networks	66
7	Educational Technology Research and Development	57
8	International Review of Research in Open and Distance Learning	54
9	British Journal of Educational Technology	48
10	Journal of Educational Computing Research	40
11	Communication Education	34
12	Educational Researcher	33
12	Review of Educational Research	33
14	Quarterly Review of Distance Education	31
15	Instructional Science	30

Bibliometrics Research Question 7: What journal article titles were cited with the highest frequency?

The quality of research and the acceptability of that research in the scholarly community in large part are dependent upon the association of the research with its references to past research. Citations connect research efforts to promote theory, answer questions of validity and reliability, evaluate the peer review process, and provide credibility and authority to a scholar's claim for new knowledge (Moed, 2005; White, 1994). Like journals, journal articles are part of the connection among literature sources that define research in distance education.

The 7,754 citations generated by this study's sample of 278 journal articles were sorted by the Microsoft Access® database, exported to Microsoft Excel®, and then filtered using the Microsoft Excel® spreadsheet data function to determine the most cited journal articles. Table 19 lists the 10 journal articles that were cited the most by *The American Journal of Distance Education*, *Journal of Distance Education*, *Distance Education*, and *Open Learning* for the period 2002 through 2006. This study's most cited author, M. G. Moore, also authored the most cited journal article (see Moore, 1989, for complete data).

Table 19

Frequency of the Ten Most Cited Journal Articles by Author

Rank	Title of Article	Number of Citations
1	Moore, M. G. 1989. Three types of interaction. *The American Journal of Distance Education, 3(2)*, 1-6.	22
2	Rourke, L., Anderson T., Garrison, D. R., & Archer, W. (1999). Assessing social presence in asynchronous text-based computer conferencing. *Journal of Distance Education, 14(2)*, 51-70.	20
3	Gunawardena, C., Lowe, C., & Anderson, T. (1997). Analysis of a global online debate and the development of an interaction analysis model for examining social construction of knowledge in computer conferencing. *Journal of Educational Computing Research, 17(4)*, 395-429.	18
3	Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *The American Journal of Distance Education, 15(1)*, 7-23.	18
5	Bullen, M. (1998). Participation and critical thinking in online university distance education. *Journal of Distance Education, 13(2)*, 1-32.	15
5	Gunawardena, C. N., & Zittle, F. J. (1997). Social presence as a predictor of satisfaction within a computer-mediated conferencing environment. *The American Journal of Distance Education, 11(3)*, 8-26.	15
7	Kanuka, H., & Anderson, T. (1998). Online social exchange, discord, and knowledge construction. *Journal of Distance Education, 13(1)*, 57-74.	14
7	Henri, F. (1992). Computer conferencing and content analysis. In A. R. Kaye (Ed.), *Collaborative learning through computer conferencing: The Najaden papers* (pp. 117-136). New York: Springer-Verlag.	14
9	Fulford, C. P., & Zhang, S. (1993). Perceptions of interaction: The critical predictor in distance education. *The American Journal of Distance Education, 7(3)*, 8-21.	12
10	Stacey, E. (1999). Collaborative learning in an online environment. *Journal of Distance Education, 14(2)*, 14-33.	11

Bibliometrics Research Question 8: What book titles were cited with the highest frequency?

Research scholars also rely heavily on books to support and provide validity to their research. The field of research in distance education is no different as distance education researchers frequently cite the knowledge and theory contained in books. The citing of books may bring authority to a researcher's study or provide the information to conduct analysis or present opposing viewpoints or theories. The purpose of including books in this study was to extend the knowledge of written communications that were referenced in the 278 journal articles and constituted the literature sample for this study. Without books, the literature map for research in distance education would be incomplete.

The eleven most frequently cited books referenced by the 278 primary journal articles are in Table 20. The determination of the most frequently cited books was accomplished using the same process which was used for journals and journal articles. The 7,754 citations generated by this study's sample of 278 journal articles were sorted by the Microsoft Access® database, exported to Microsoft Excel®, and then filtered using the Microsoft Excel® spreadsheet data function to determine the most cited books. Moore's and Kearsley's (2005), *Distance education: A systems view*, tied for the most cited book with Vygotsky's (1978), *Mind in society: The development of higher psychological processes*. The most recent book was Moore's and Anderson's *Handbook of distance education* published in 2003.

Table 20

Frequency of the Most Cited Books

Rank	Title of Book	Number of Citations
1	Moore, M.G., & Kearsley, G. (1996). *Distance education: A systems view.* Belmont, CA: Wadsworth.	25
1	Vygotsky, L.S. (1978). *Mind in society: The development of higher psychological processes.* Cambridge, MA: Harvard University Press.	25
2	Laurillard, D. (1993). *Rethinking university teaching: A framework for the effective use of educational technology.* London: Routledge.	22
3	Moore, M.G., & Anderson, W.G. (Eds.). (2003). *Handbook of distance education.* Mahwah, NJ: Lawrence Erlbaum.	21
3	Mason, R., & Kaye, A. (Eds.). (1989). *Mindweave: Communication, computers and distance education.* Oxford: Pergamon.	21
3	Khan, B.H. (Ed.). (1997). *Web-based instruction*. Englewood Cliffs, NJ: Educational Technology Publications.	21
4	Jonassen, D.H. (Ed.). (1996). *Handbook of research for educational communications and technology.* New York: Macmillan.	19
5	Lockwood, F. (Ed.). (1995). *Open and distance learning today.* London: Routledge.	18
6	Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation.* Cambridge, UK: University Press.	17
7	Palloff, R.M., & Pratt, K. (1999). *Building learning communities in cyberspace*: *Effective strategies for the online classroom*. San Francisco: Josey-Bass.	16
8	Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity.* Cambridge, UK: University Press.	16

Bibliometrics Research Question 9: What type of publication was cited with the highest frequency?

Written publications are the primary communication medium for researchers to share their research with other scholars and advance the production and acquisition of knowledge in their particular domain. Research in distance education is primarily communicated with researchers and practitioners in distance education through written publications. For the purpose of this study, the important question provided by this research question is: Where do researchers share their distance education research with others? The answer to this question provides the “Where do we look?” The answers to

the previous research questions told us what to look for in regards to journals, journal articles, and books. In other words, we know what to look for on the shelf, this specific research question sought to determine upon which shelves to look.

Periodicals, book, technical/research report, electronic media, unpublished dissertation, and "other" were the coding choices for type of publication. Each of the 7,754 citations generated by this study's sample of 278 journal articles were coded by type and entered into the data base. The Microsoft Access® database sort and count functions generated the frequencies of publication type in Table 21. Periodicals and books were the primary source of citations at 78 percent of the total.

Table 21

Frequency of Publication Type for Citations

Type of Publication	Total number of citations	Percent of total citations
Periodicals	3,376	44%
Book	2,624	34%
Tech/Research Report	1,241	16%
Electronic media	219	3%
Unpublished	46	1%
Dissertation	106	1%
Other	142	2%
Total citations	7,754	100%

Bibliometrics Research Question 10: What bibliographic coupling relationships or patterns exist among the literature?

The method of bibliographic coupling indicates a relationship between two citing documents that have common citations (see Figure 14). Bibliographic coupling extends this study's analysis of the research in distance education literature. The bibliographic

coupling relationships found among citing documents provides an indication of scholarly influence, author prominence, and identify key connections between research points on the distance education literature map. A coding scheme was employed where each of the 278 journal articles (citing documents) and each of the 7,754 citations were assigned a unique tracking identification number. Converting each of the journal articles and citations to a tracking identification number facilitated data sort and filter functions found in Microsoft Access® and Microsoft Excel®.

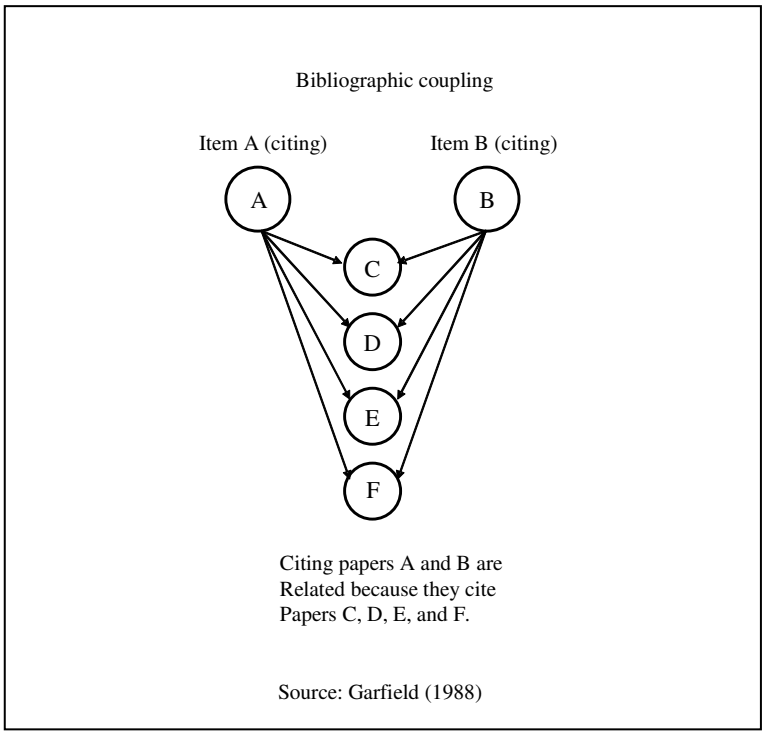


Figure 14. Bibliographic coupling

The 278 citing journal articles and their associated 7,754 citations were sorted by the Microsoft Access® database, exported to Microsoft Excel®, and then filtered using the Microsoft Excel spreadsheet data function. The analysis found 265 of the 278 citing journal articles exhibited some type of "coupling relationship" indicating some

magnitude of shared citations. The relationships ranged from two common citations to 25 common citations for the bibliographic couplings of the 265 citing journal articles.

This study eliminated coupling relationships with only one common citation due to the small coupling strength. Bibliographic coupling relationships were normalized using Jarneving's (2005, p. 250) formula to account for the differences in the length of journal article reference lists.

$$CS_{ij} = \frac{r_{ij}}{\sqrt{(r_i * r_j)}}$$ note: square root

CS_{ij} = coupling strength between paper i and paper j

r_{ij} = the number of references common to both i and j

r_i = the number of references in the reference list of paper i

r_j = the number of references in the reference list of paper j

The use of Jarneving's normalized coupling strength for this study's purpose provides only a method for ranking bibliographic coupling relationships. Jarneving did not provide criteria for ranking normalized coupling strengths as significant nor on a continuum from weak to strong. The top 30 normalized bibliographic coupling relationships are in Table 22. The tracking identification numbers for the citing documents identified in Table 22 are found in Appendix C.

Table 22

Ranked List of the Top Thirty Normalized Bibliographic Coupling Relationships

Rank	Citing Document i Tracking Number	Citing Document j Tracking Number	Number of Common Citations i and j r_{ij}	Number of Citations Document i Reference List r_i	Number of Citations Document j Reference List r_j	Jarneving's Coupling Strength between i and j CS_{ij}
1	241	59	25	35	35	0.714286
2	131	75	12	17	24	0.594089
3	49	58	18	36	31	0.538816
4	78	252	13	24	33	0.461935
5	106	259	11	18	37	0.426241
6	165	163	2	8	3	0.408248
7	234	263	7	20	18	0.368932
8	39	78	9	25	24	0.367423
9	41	241	12	33	35	0.353094
10	171	230	23	89	52	0.338089
11	62	239	8	26	22	0.334497
12	236	252	11	35	33	0.323669
13	252	255	9	33	28	0.296078
14	140	150	8	17	43	0.295891
15	129	228	8	29	26	0.291343
16	187	209	8	18	42	0.290957
17	236	255	9	35	28	0.287494
18	15	58	11	53	31	0.271378
19	167	163	2	19	3	0.264906
20	41	59	9	33	35	0.26482
21	84	202	6	28	19	0.260133
22	54	111	2	6	11	0.246183
23	78	236	7	24	35	0.241523
24	165	166	2	8	9	0.235702
25	103	162	4	17	17	0.235294
26	228	8	5	26	18	0.231125
27	15	49	10	53	36	0.228934
28	80	241	8	36	35	0.225374
29	76	217	5	26	20	0.219265
30	162	103	4	21	17	0.211702

Note: Coupling strength defined as: $CS_{ij} = \frac{r_{ij}}{\sqrt{(r_i * r_j)}}$ note: square root

Bibliometrics Research Question 11: What co-citation analysis relationships or patterns exist among the literature?

The method of co-citation analysis indicates a relationship between two citations that are cited by the same citing document (see Figure 15). Similar to bibliographic coupling, co-citation analysis extends this study's analysis of the research in distance education literature. The tracking identification number system previously discussed for the 278 journal articles and citations facilitated data sort and filter functions found in Microsoft Access® and Microsoft Excel®.

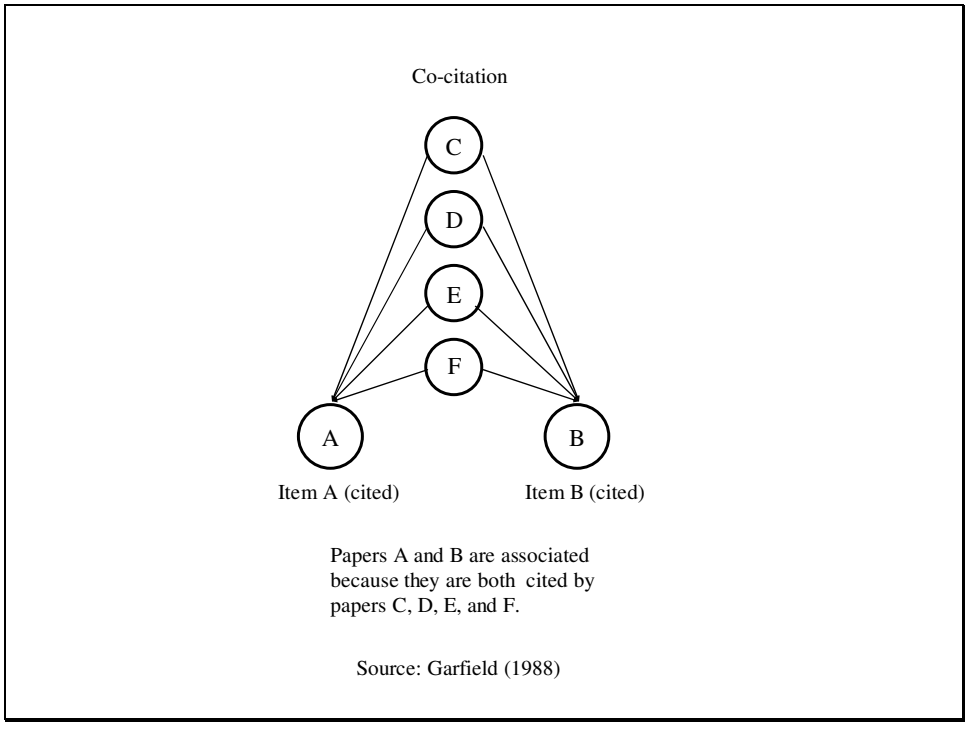


Figure 15. Co-citation analysis

The 278 journal articles chosen for this study and their associated 7,754 citations were sorted by the Microsoft Access® database, exported to Microsoft Excel®, and then

analyzed using the Microsoft Excel® spreadsheet data functions for sort and filter. This procedure eliminated co-citation relationships based on a limited number of common citing documents (between one and three) due to the small co-citation strength that existed within this range. The elimination of these low range relationships left the researcher with 97 co-citation relationships exhibiting from between four to ten common citing documents. Co-citation relationships were normalized using Jarneving's (2005, p. 251) formula to account for the differences in the length of journal article reference lists.

$$CS_{ij} = \frac{coc_{ij}}{\sqrt{(cit_i * cit_j)}} \quad \text{note: square root}$$

CS_{ij} = co-citation strength between document i and j

coc_{ij} = the number of co-citations between i and j

cit_i = the number of citations for document i

cit_j = the number of citations for document j

The use of Jarneving's normalized co-citation strength provides only a method for ranking the strength. Garfield (1980) also considered strength to be an arbitrary value based on the researcher's purpose and amount of data precision required to produce citation maps. The top 30 normalized co-citation relationships are in Table 23. The tracking identification numbers for the citations identified in Table 23 are found in Appendix D.

Table 23

Ranked List of the Top Thirty Normalized Co-Citation Relationships

Rank	Citation Document i Tracking Number	Citation Document j Tracking Number	Number Co-citations i and j coc_{ij}	Number of Citations for document i cit_i	Number of Citations for document j Cit_j	Jarneving's Co-citation Strength between i and j CS_{ij}
1	34	152	4	5	5	0.8
2	34	391	4	5	6	0.730297
2	152	391	4	5	6	0.730297
2	349	677	4	6	5	0.730297
5	158	665	4	4	8	0.707107
6	34	36	4	5	7	0.676123
6	36	152	4	7	5	0.676123
6	304	704	4	5	7	0.676123
6	422	830	4	7	5	0.676123
6	797	794	4	5	7	0.676123
11	15	790	4	6	7	0.617213
11	36	391	4	7	6	0.617213
13	651	261	4	12	4	0.57735
14	310	649	10	18	17	0.571662
15	786	117	4	10	5	0.565685
16	466	805	9	16	17	0.545705
17	310	704	6	18	7	0.534522
18	304	310	5	5	18	0.527046
19	310	786	7	18	10	0.521749
20	15	786	4	6	10	0.516398
20	436	411	4	4	15	0.516398
22	290	729	5	9	11	0.502519
23	323	343	6	8	18	0.5
24	185	729	4	6	11	0.492366
24	729	399	4	11	6	0.492366
26	186	649	4	4	17	0.485071
27	343	651	7	18	12	0.47629
28	2	286	4	4	18	0.471405
28	309	342	4	18	4	0.471405
28	342	343	4	4	18	0.471405

Note: Co-citation strength defined as: $CS_{ij} = \frac{coc_{ij}}{\sqrt{(cit_i * cit_j)}}$ note: square root

The final analysis method involved designing a cluster map to provide a graphical representation of the co-citation relationships found among the citation links evident within the reference lists of the 278 articles utilized in this study (Garfield, 1980). The top thirty co-citation relationships in Table 23 have been expanded to the 97 co-citation relationships previously mentioned with the number of common citing documents (ranging from four to ten) displayed in Figure 16. The identification tracking number coding scheme for citation documents identified in Figure 16 are discussed in Appendix D.

Figure 16 shows the connections between co-citations indicating the citations are found in the same reference list (ranging from four to ten reference lists) of the 278 journal articles. Of the 97 co-citation relationships, a pathway connects 93 co-citations with four not connected to the main network of 93. The four not connected to the main cluster are the three clusters at the bottom of Figure 16 (co-citations 665 - 158; 665 - 605; 422 - 830; and 349, - 677). The numbers within the boxes of Figure 16 represents the identification tracking number for a specific citation document in Appendix D.

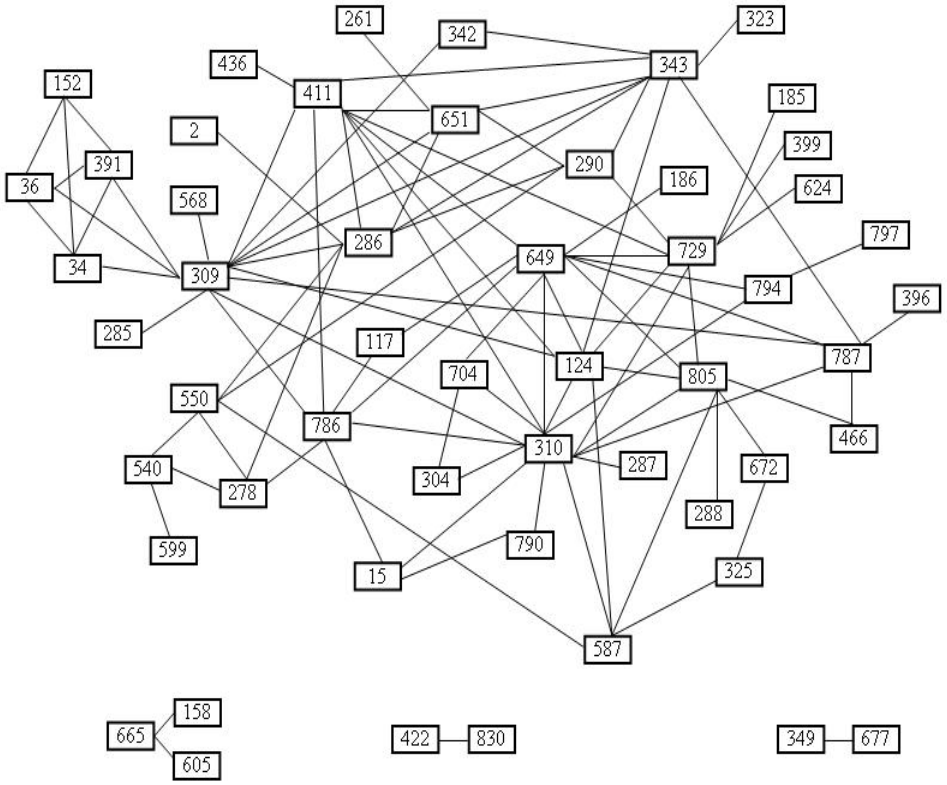


Figure 16. Co-citation cluster map

Summary

This chapter has reported the data generated to answer this study's guiding research question: To what extent have the IHEP (2000) benchmarks guided recent distance education research and did bibliometric methods identify relationships among the recent research publications to provide an empirical map of the research in distance education? The content analysis of the recent literature in distance education identified benchmarks in the existing literature as well as potentially new benchmarks that serve as

parameters in judging the quality of distance education programs. The analysis of the bibliometric data has revealed the more prominent authors, leading publications, and relationships among the cited documents regarding their citations that contribute to the body of research in distance education.

The analysis of this data will provide a comparison of the content analysis results with the 2000 IHEP findings which recommended the 24 benchmarks considered important in determining quality in distance education programs. The data in this chapter will be synthesized to present findings and conclusions concerning distance education research and the publications and authors who contributed to that research. The analysis and interpretations found in Chapter V are intended as the foundation for recommendations to improve research and inform practice in distance education.

CHAPTER V

Summary, Conclusions, and Recommendations

Overview of the Study

Scholars in any field of study are required to lay the foundation of their research on the existing literature that relates to the domain of their interest. The promotion of theory and the continued evolution and improvement of practice are highly dependent on the publication of research and the need for scholars to subject the published literature to scrutiny. Scrutiny takes the form of replicating existing studies, analyzing the validity and reliability claims made by researchers; and the key theme to this study, analyzing the previous literature and their citations that connect research to the existing body of knowledge.

The purpose of this study was to analyze the recent distance education literature to determine which of the 2000 Institutional for Higher Education Policy (IHEP) benchmarks were cited in articles which appeared in *The American Journal of Distance Education*, *Distance Education*, *Journal of Distance Education*, and *Open Learning* from 2002 through 2006. During this time period, 278 journal articles whose reference lists generated 7,754 citations were published in these four journals. Content analysis was the methodology used to analyze the literature sample for the presence of IHEP benchmarks. A secondary purpose of the study was to utilize bibliometric methods to analyze the

patterns and relationships among in the literature sample and the sample's associated reference list. This study was guided by the following general research question:

> To what extent have the IHEP benchmarks from 2000 guided recent distance education research, what relationships among the research publications did the bibliometric methods identify, and how did the results improve distance education research?

Summary and Conclusion

Content Analysis Research Question 1: Which IHEP benchmarks were reiterated in the research literature and at what frequency?

The first content analysis sought to analyze the frequency the 45 IHEP benchmarks were found in the literature sample of the 278 journal articles. The three benchmarks which occurred most frequently had a frequency notably higher than the remaining 42 benchmarks. The three benchmarks which occurred most frequently are also part of the teaching/learning benchmark category which also accounted for over 50 percent of the benchmarks found in the research literature. The top three benchmarks (frequency found in the 278 journal articles), (1) Student/faculty interaction (66.91%), (2) student/student interaction (61.15%), and (3) communication collaboration (40.29%) were separated by 12.59 points from the fourth ranking benchmark, multiple evaluation methods (27.70%). Twenty-nine of the 45 benchmarks were found in less than ten percent of the 278 journal articles.

Table 8, *Frequency of IHEP Benchmarks Found in the Research Literature*, found in Chapter IV is replicated here and shows the benchmarks which are critical to Internet-based quality distance education (see Table 24). Four additional benchmarks ranked in the top fifteen by frequency, but were not included as part of the final 24 IHEP benchmarks. These new benchmarks were (1) materials collaboration (23.02%), (2) groups problem-based learning (21.22%), (3) time expectations-students (15.83%), and (4) learning styles (11.15%). The high ranking of these four benchmarks indicates a need for further research and literature analysis to support or refute their addition to the current 24 IHEP benchmarks. Nineteen benchmarks included in the final 24 IHEP benchmarks appeared in fewer than ten percent of the articles. Indeed the frequency of the benchmarks reiterated in the literature may not only support their importance to quality in distance education research, but may also reflect solely the interests of this body of researchers. However, many of these topics may not lend themselves to research. The top three frequency-ranked benchmarks do support the transactional distance theory developed by Moore (1989, 1993), the importance of interaction (Roblyer & Wiencke, 2003), and the constructivist, learner-centered and collaborative approach to quality distance education pedagogy as discussed in Chapter II of this study.

This study's literature sample found a substantial increase for the topic of interaction compared to the Lee et al. (2004) study. This study analyzed 278 articles from *The American Journal of Distance Education*, *Distance Education*, *Journal of Distance Education*, and *Open Learning* between 2002 and 2006 and categorized over 60 percent of the articles as interaction while Lee et al. analyzed 383 articles from the same four journals between 1997 and 2002 and categorized only 6.8 percent of the articles as

interaction. This finding has practical significance and reflects the increased importance of connecting students and faculty through a multitude of new asynchronous and synchronous technologies. The results reflect the emphasis of the recent research in distance education for learner-centered pedagogy that promotes collaborative learning.

Table 24

Frequency of IHEP Benchmarks Found in the Research Literature with Final 24 IHEP Benchmarks

Rank	Benchmark Number* (Included in IHEP 24, yes or no)	Benchmark*	Number of Benchmarks found in Citing Articles (*f*)	% 278 Citing Articles
1	14 (yes)	Student/faculty interaction	186	66.91%
2	15 (yes)	Student/student interaction	170	61.15%
3	21 (yes)	Communication collaboration	112	40.29%
4	41 (yes)	Multiple evaluation methods	77	27.70%
5	23 (no)	Materials collaboration students	64	23.02%
6	17 (yes)	Constructive feedback	62	22.30%
7	22 (no)	Groups problem-based learning	59	21.22%
8	16 (yes)	Timely feedback	50	17.99%
9	42 (yes)	Evaluation – continuous improvement	46	16.55%
10	25 (no)	Time expectations - students	44	15.83%
11	24 (yes)	Supplemental course information	42	15.11%
12	29 (yes)	Student distance education dispositions	32	11.51%
13	9 (no)	Learning styles	31	11.15%
13	27 (yes)	Library resources	31	11.15%
13	37 (yes)	Transition face-to-face to distance ed	31	11.15%
16	20 (yes)	Module Higher Order Thinking Skills	29	10.43%
17	31 (yes)	Student help	27	9.71%
18	12 (yes)	Technology based learning outcomes	24	8.63%
18	30 (yes)	Learning outcomes identified	24	8.63%
20	34 (yes)	Technical assistance	23	8.27%
21	33 (yes)	Program info supplied	22	7.91%
22	8 (no)	Team course design	21	7.55%
22	36 (yes)	Technical assistance - faculty	21	7.55%
24	39 (yes)	Continuous faculty training	17	6.12%
25	1 (no)	Faculty incentives	15	5.40%
25	5 (yes)	Infrastructure support	15	5.40%
25	18 (no)	Course modules	15	5.40%
25	32 (yes)	Train students search info	15	5.40%
29	10 (no)	Assess learning styles	14	5.04%
30	7 (yes)	Development guidelines	13	4.68%
31	2 (no)	Institutional rewards	12	4.32%
31	28 (yes)	Instruct students research	12	4.32%
33	19 (no)	Module length	11	3.96%
34	11 (no)	Consistent course curriculum	10	3.60%

Rank	Benchmark Number* (Included in IHEP 24, yes or no)	Benchmark*	Number of Benchmarks found in Citing Articles (*f*)	% 278 Citing Articles
34	38 (yes)	Peer mentor faculty	10	3.60%
36	45 (yes)	Review objectives periodically	9	3.24%
37	43 (yes)	Standards	8	2.88%
38	26 (no)	Faculty response time	7	2.52%
38	40 (yes)	Written resources faculty	7	2.52%
40	3 (yes)	Technology plan	6	2.16%
40	44 (yes)	Data available - evaluation	6	2.16%
42	4 (yes)	Security measures	5	1.80%
43	13 (yes)	Periodic materials review	4	1.44%
44	6 (no)	Approval process	3	1.08%
44	35 (yes)	Complaint system	3	1.08%
Total occurrences of benchmarks reiterated in the literature			1,445	

*See Appendix A for benchmarks numbers and a full description of the benchmark.

Summary and Conclusion

Content Analysis Research Question 2: What new benchmarks were identified in the research literature?

Pre-orientation to the distance education course or program (15.47%) and learner interaction with the content (10.43%) were the two most frequently found new benchmarks in the analysis of the research literature. The frequency of the acknowledgement of these two new benchmarks would have ranked them eleventh and sixteenth respectively if compared with the existing benchmarks. Posting a course syllabus prior to course enrollment would assist students in understanding the computer skills and time commitment required to complete course activities and assignments. The importance of pre-orientation to quality in distance education is related to increasing the students' chances of a experiencing a successful learning experience and reducing drop-

out rates discussed in Chapter I Statement of the Problem as the "humanness" approach to technology (Barron, 2003; Naisbitt, 1999).

The learner-content interaction was identified by Moore (1989) as part of his transactional distance theory which consisted of three types of interactions: learner-teacher, learner-learner, and learner-content. The course structure influenced learner-content interaction along a continuum from no deviation from course materials to the course materials accommodating the learner's needs. The increased research of the learner-content interaction has been influenced by recent research in course design and online pedagogy. Chapter II highlighted the challenges of changing online courses from "page-turners" of course texts into electronic pages (MacDonald, 2001). The increased use of asynchronous and synchronous communication technologies, multimedia, online library and research tools, and learner-centered activities to enhance the learner-content interaction have improved the quality of distance education.

Summary and Conclusion

Bibliometrics Research Question 1: Which citing authors were the primary contributors to the research?

Kanuka and Conrad received the top ranking for the most citations for authorships with five articles and were the only authors to publish in all four journals in this study's literature sample. An individual benchmark was coded only once in reference to a given article; therefore, it was noteworthy to summarize the benchmarks found in the articles of the primary contributors to this body of research. The content analysis of Kanuka's five articles resulted in 43 individual instances of content containing 2000 IHEP benchmarks

with 27 of the 43 benchmarks classified into the teaching/learning and course structure categories. The content analysis of Conrad's five articles resulted in 21 individual instances of content containing 2000 IHEP benchmarks with 14 of the 21 benchmarks classified into the teaching/learning category.

Fahy, Jeong, and Zhang represented the next set of rankings for the cited authors and their combined eleven journal articles resulted in 38 individual instances of content containing the 2000 IHEP benchmarks with 29 of the 38 benchmarks classified into the teaching/learning category. The top five authors contributed a total of 21 journal articles that produced 102 individual instances of content containing the IHEP benchmarks. These five authors focused on the categories of teaching/learning and course structure, but the remaining five benchmark categories were also mentioned by the primary contributors. The magnitude and the breadth of benchmark findings across categories indicated a connectedness of quality components within the systems approach to quality in distance education.

Summary and Conclusion

Bibliometrics Research Question 2: Which authors received the highest frequency of citations?

Moore, Garrison, Jonassen, Gunawardena, and Rourke were ranked as the top five authors receiving the highest frequency of citations. These findings are similar to Lee et al. (2004) whose study also found Moore and Garrison to be the most cited authors. A comparison between this study and Lee et al. identified five authors in common who received the most citations in both studies. These authors are Moore, Garrison, Mason,

Bates, and Harasim. The research of these highly cited authors in the four leading distance education journals should be considered by others who are conducting research or examining the existing knowledge in the field of distance education

Summary and Conclusion

Bibliometrics Research Question 3: What type of organizational affiliations do the citing authors represent?

Academic institutions were the overwhelming majority accounting for 95.3 percent of citing author's organizational affiliation. All of the authors represented higher education and the high percentage is not unexpected given the research mission of many universities and colleges and the role research contributes towards faculty tenure decisions. However, the organizational affiliation for secondary authors was not recorded and some researchers did co-author research with individuals from the public and private sector. In some cases the co-authors were employed by organizations that were the subject of academic research and participated in case studies and survey research.

Summary and Conclusion

Bibliometrics Research Question 4: What research methods were reflected in the literature?

The 1999 IHEP report and Moore (2003a) were critical of distance education research based on their assessment that the literature reflected a predominance of descriptive studies and studies that lacked a theoretical or conceptual framework. The five studies discussed in Chapter II, Previous Reviews and Analysis of Research in

Distance Education also identified a predominance of descriptive studies (see Table 5). The five Chapter II studies are: Koble and Bunker (1997), Anglin and Morrison (2000), Berge and Mrozowski (2001), Rourke and Szabo (2002), and Lee et al. (2004).

A comparison between this study and the five studies discussed in Chapter II did not totally contradict the concerns of the IHEP and Moore. This study classified 31 percent of the 278 citing journal's research methodology as descriptive. The range of the five Chapter II studies classified as descriptive was from 46 percent to 81 percent; however, a comparison of the results between studies must be analyzed with caution even though this study's results identified a lower percentage of descriptive research and higher percentages for quantitative, mixed, and qualitative studies (see Table 5 and Table 17). Many of this study's journal articles were coded as quantitative or mixed research methods, but employed descriptive statistics and contained no inferential statistics to identify correlations, make predictions, or conduct tests of significance. The other five studies in Table 5 may have categorized these studies as descriptive. A comparison of this study's findings to the findings of the five studies cited in Chapter II indicated that descriptive studies still dominated the research literature.

Summary and Conclusion

Bibliometrics Research Question 5: What benchmark category and research methodology differences were found between the four journals which comprised the citing references?

Benchmark category and research methodology differences among the four journals were analyzed based on IHEP benchmark categories and research methodology

for the 278 citing articles. The results for the course structure and evaluation/assessment benchmark categories were the major benchmark categorical differences between the four journals (see Table 16) with *Distance Education* and *Open Learning* containing 124 of the 192 (64.6%) course structure benchmarks and 104 of the 146 (71.2%) findings for the evaluation/assessment benchmarks. The remaining benchmark categories were more evenly distributed across the four journals. These findings may indicate a geographical factor related to course structure and evaluation/assessment considering *Distance Education* is published in Australia and *Open Learning* is published in the United Kingdom for the Open University. Many of the contributing authors for these two journals were scholars from the Open University in the United Kingdom. The Open University is one of the largest institutions in the world with over 180,000 students who are primarily enrolled in distance education courses. The Open University has no entry requirements and the institution serves primarily students who are employed full-time. The characteristics of the Open University may have influenced the importance of course structure and evaluation/assessment benchmarks and the amount of research studies for these categories as indicated by this study's findings. Are there differences in the evaluation of distance education programs between countries? What countries do the authors represent who contributed to evaluation/assessment benchmarks? What other factors may contribute to differences and are there opportunities for benchmarking among programs? A comparison of accreditation standards among countries in relation to the IHEP benchmarks may also indicate possible differences. Answers to these questions, finding reasons for differences, and an expansion of research will advance the quality of distance education.

A comparison of research methodologies among the four journals illuminated differences between the number of articles coded of articles coded as quantitative in *The American Journal of Distance Education* (see Table 17) and the other three journals. Thirty-seven of the sixty-two (60%) *The American Journal of Distance Education* articles from the literature sample for the study were coded as quantitative. Further analysis into the peer review process and subscription holders of the four journals may provide an avenue for possible explanation of the difference. For example, an analysis of the research conducted by scholars reviewing a particular journal may provide an indication of their methodological philosophy. The reviewers of *The American Journal of Distance Education* are listed at the beginning of each journal publication and a search of their publication may indicate a preponderance of quantitative studies. Rourke and Szabo (2002) noted the large number of non-academic practitioners who make up the target audience of the *Journal of Distance Education* which may indicate a reason for the small number of quantitative studies found in the journal. Moore as editor of *The American Journal of Distance Education* and an ardent supporter for promoting theory in the literature may have influenced the peer review process and article acceptance rate resulting in a larger percentage of quantitative studies. Moore (2003a) noted the selection of authors for the *Handbook of Distance Education* included authors who "at a minimum, every one has been published at least once in *The American Journal of Distance Education"* (p. xi), a journal which according to this study's findings contained 60 percent quantitative studies. A comparison for the other research methodology categories between the four journals found only small differences.

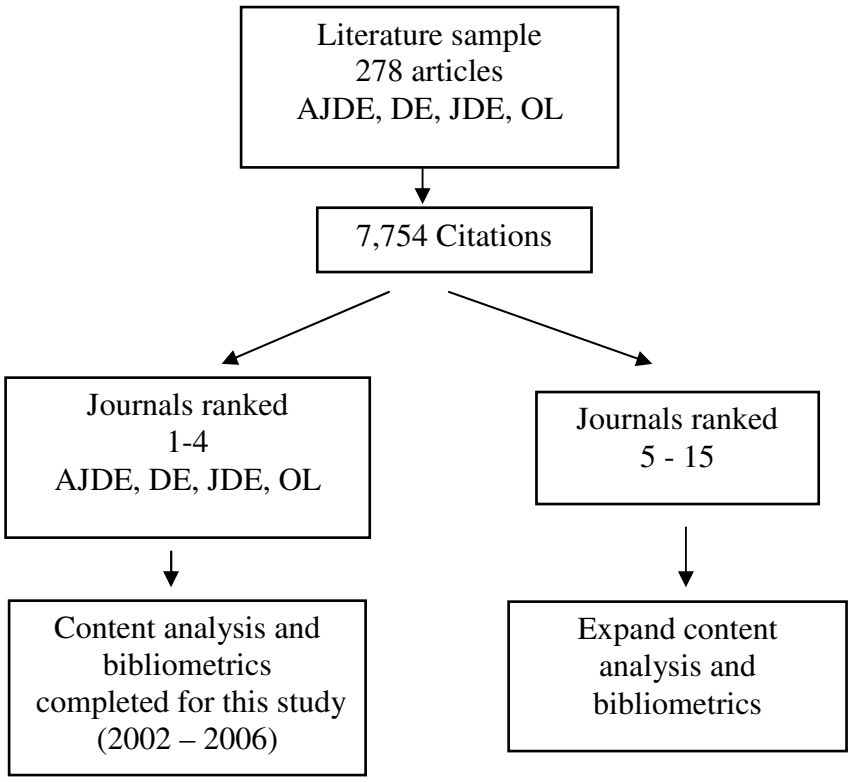
Summary and Conclusion

Bibliometrics Research Question 6: What journal publications were cited with the highest frequency?

The 7,754 citations generated by this study's sample of 278 journal articles were sorted by the Microsoft Access® database, exported to Microsoft Excel®, and then filtered using the Microsoft Excel® spreadsheet data function to determine the most cited journals. The top four journals found in the 7,754 citations in rank order were: (1) *The American Journal of Distance Education*, (2) *Distance Education*, (3) *Open Learning*, and (4) *Journal of Distance Education* (see Table 18). What is noteworthy is that these are the same four journals that constituted this study's literature sample and are considered by distance education scholars to be the leading journals in distance education. The result is not unexpected considering that the reference lists of the 278 journal articles would contain a large number of citations from *The American Journal of Distance Education*, *Distance Education*, *Open Learning*, and the *Journal of Distance Education.* These four journals are considered the leading journals for research in distance education. The authors' foundational references are contained in the leading journals of the field and the peer review process may lead researchers to expect to find the critical citations in these dominant journals.

The literature review found in Chapter II and the findings found in Table 18 have established *The American Journal of Distance Education*, *Distance Education*, *Open Learning*, and the *Journal of Distance Education* as the primary journals for research in distance education. However, important new knowledge can be found in Table 18 in the

journals which rank below the four primary journals. The eleven journals ranked five through fifteen should be considered by researchers as an important source of relevant research based on their relationship of being cited in articles from the four leading journals in distance education research (see Figure 18). The authors of the this study's sample of 278 articles from the four leading journals cited articles from the journals ranked five through fifteen a total of 503 times. These eleven journals could also be the starting point for continued content analysis and bibliometric methods to analyze quality in distance education and citation relationships.



The American Journal of Distance Education (*AJDE), Distance Education (DE), Journal of Distance Education (JDE), Open Learning* (*OL*)

Figure 17. Analysis: Journal publications cited with the highest frequency

Summary and Conclusion

Bibliometrics Research Question 7: What journal article titles were cited with the highest frequency?

The 7,754 citations generated by this study's sample of 278 journal articles were sorted by the Microsoft Access® database, exported to Microsoft Excel®, and then filtered using the Microsoft Excel® spreadsheet data function to determine the most cited journal article titles. The top five cited journal article titles contained the works of Moore, Rourke, Garrison, Gunawardena, and Bullen, all authors who were cited enumerable times throughout the references (see Table 13 and Table 19). This study's most frequently cited author, Moore, also had the more recorded citations of his journal article titles with "Three types of interaction" from *The American Journal of Distance Education,* 1989, 3(2).

In addition to analyzing the authors of the high frequency journal articles, an examination of the topics found in the top ten journal article titles also yields important knowledge. A topical analysis of the high frequency journal article titles reinforces the importance of interaction in distance education. The top ten cited titles all related to the 2000 IHEP benchmarks for interaction (see Table 19). A content analysis of the top ten articles would add to the knowledge already generated in this study for which IHEP benchmarks were reiterated in the research literature and at what frequency. An analysis of the reference lists of the top ten articles would also add to the bibliometric information found in this study resulting in an enhanced literature map for research in distance education. Researchers developing a theoretical or conceptual framework build on the

studies of other scholars primarily through the use of research publications. Adding to the co-citation cluster map (see Figure 16) would provide more precision to the literature relationships for research in distance education. The more knowledge researchers have of the research literature in distance education the stronger their support for their theoretical or conceptual framework becomes as they build upon this existing research.

Summary and Conclusion

Bibliometrics Research Question 8: What book titles were cited with the highest frequency?

The 7,754 citations generated by this study's sample of 278 journal articles were sorted by the Microsoft Access® database, exported to Microsoft Excel®, and then filtered using the Microsoft Excel® spreadsheet data function to determine the most cited book titles. The 7,754 citations contained 2,624 (34%) references to books with the most cited book belonging to this study's leading cited author, Moore and co-author Kearsley for the 1996 *Distance education: A systems view* published in 1996 and revised in 2005 (see Table 20). Moore's and Kearsley's top ranking was shared with Vygotsky's *Mind in society: The development of higher psychological processes* published in 1978. *Distance education: A systems view* is an introductory textbook covering a wide range of distance education topics. *Mind in society: The development of higher psychological processes* was primarily cited by documents related to the constructivist, learner-centered approach to distance education pedagogy.

Moore's and Anderson's *Handbook of distance education* published in 2003 was the most recent book on the list of the most cited books (see Table 20), ranked third on

the list, and can be expected to become the leading book title cited in the distance education literature. The other eleven books found in Table 20 were published between 1978 and 1999 with eight of the eleven published between 1991 and 1999. One can extrapolate and make the inference that over time the *Handbook of distance education* will gain the citations to become the most cited book. The *Handbook of distance education* consists of 55 chapters organized in thematic sections and authored by the leading researchers and scholars in distance education. The authors of the 55 chapters are many of the leading authors identified in this study that will be discovered by other distance education researchers in their literature searches and ultimately lead back to the references to the *Handbook of distance education*.

Finally, *Situated learning: Legitimate peripheral participation* by Lave and Wenger published in 1991 and *Communities of practice: Learning, meaning, and identity* by Wenger and published in 1998 deserve special recognition as the foundation of research related to online communities of practice. Online communities of practice are proliferating as a means to promote interaction and communication among cohorts who have a common interest. The majority of the published research in *communities of practice*, to include articles found in this study, references the works of Lave and Wenger. The purpose of utilizing communities of practice to promote interaction and collaboration are highly influenced by constructivist and social learning principles.

Summary and Conclusion

Bibliometrics Research Question 9: What type of publication was cited with the highest frequency?

The 7,754 citations contained 6,000 (78%) references to periodicals and books. Technical and research reports, primarily conference presentations and papers, accounted for only 16 percent of the publications that were cited. According to White (1994) these results are not unexpected since periodicals, books, reports, and presentations are the primary modes for researchers to make claims of new knowledge and share their findings with other researchers. The low result for electronic media at three percent was an unexpected result considering the use of online resources continues to expand and many documents are now easily posted in digital format on the Internet. The low results for electronic media could also be considered a positive finding since many of the electronic media references are not peer reviewed. The peer review or refereed process provides an editing procedure to subject research to scrutiny by other scholars in the same academic discipline and provide credibility to the research. That is not to say that the peer review process guarantees credibility or is without error, but it is an accepted process that adds reliability to the research. The continued growth of the Internet and online research tools will present researchers the challenge of judging the reliability and trustworthiness of electronic media.

Summary and Conclusion

Bibliometrics Research Question 10: What bibliographic coupling relationships or patterns exist among the literature?

Eight of the top ten ranked bibliographic coupling relationships were between the highly cited documents and the same set of primary authors (see Table 22 and Appendix C). Twenty of the top twenty-five ranked bibliographic coupling relationships existed where the same primary or secondary author produced the citing documents. These results are not unexpected considering the two coupled document's research topics were similar and the coupled document's reference lists to support the research would have some degree of intersection. Researchers developing a theoretical framework or expanding the existing body of knowledge for a specific topic can be expected to cite common references that form the foundation of their research. Different publications with similar topics produced by the same author or authors have a high chance of being coupled since the authors are building on their previous research.

The top three ranked bibliographic coupling relationships demonstrate the commonality of research topic. The top ranked relationship between the two citing documents authored by Conrad had a common research topic related to the interaction of online learners. Gorsky produced the second ranked relationship with two documents related to the online dialogue in distance education science courses as the common research theme. The third ranked relationship occurred between two documents authored by Fahy related to interaction and the analysis of computer conference transcripts.

Bibliographic coupling relationships are limited since citing documents are either coupled or not coupled and the relationship does not change over time (Garfield, 1980;

Jarneving, 2005). This study's bibliographic coupling data provided limited information other than coupled documents with common authors produce stronger relationships. The bibliographic coupling data primarily identified that coupling relationships were strongest between two documents produced by the same author or group of authors. Co-citations may offer richer data and citations may evolve as citations not presently connected may become connected in future publications. The strength and extent of co-citations may increase over time as citations for a particular reference increase and possibly new co-citation relationships are established as new literature is published. The co-citation cluster map for research in distance education will continue to contain more relationships as the body of knowledge through publications increases.

Summary and Conclusion

Bibliometrics Research Question 11: What co-citation analysis relationships or patterns exist among the literature?

Sixteen of the top twenty ranked co-citation relationships between citations related to the theme of interaction (see Table 23 and Appendix D). This study eliminated co-citation relationships based on a limited number of common citing documents (between one and three) due to the small co-citation strength that existed within this range. The elimination of these low range relationships left the researcher with 97 co-citation relationships exhibiting from between four to ten common citing documents. The cluster map was the primary analysis tool for the co-citation relationships and maps the key 97 co-citation relationships generated by this study's literature sample of 278 journal articles (see Figure 16).

Figure 16 has been reproduced with the clusters highlighted with more than five co-citation relationships (see Figure 18). Figure 18 represents a web of citations that form the foundation of distance education research and theory. The twelve highlighted clusters may be considered as the focal points for continued research in the quality of online education and in the field of distance education. The need for expanding distance education based on theory (IHEP, 1999; Moore, 2003a) could start with the citations found in the clusters highlighted in Figure 18. Interaction, critical thinking, collaborative learning, and communities of practice were the major topics reflected in the titles of the twelve major clusters (see Appendix D). All of these topics relate directly to the final 2000 IHEP benchmarks within the course development and teaching/learning categories. Researchers who desire to expand the research and theory in distance education should include these citations and in their search of the literature since the strength of the co-citation relationship indicates their existing prominence in the research literature.

A specific example will illustrate citation relationships found in Figure 18. Cluster 651 is Rourke et al's. (2001) study on computer conference transcripts. Cluster 651 has co-citation relationships to clusters 261, 286, 290, 309, 343, and 411. The publications associated with these clusters related to the following topics:

Cluster 261- problems in transcript analysis

Cluster 286 – critical thinking, cognitive presence, and computer conferencing

Cluster 290 – critical inquiry, computer conferencing

Cluster 309 – interaction analysis model, computer conferencing

Cluster 343 – computer conferencing, content analysis

Cluster 411 – online interaction and knowledge construction

Researchers studying synchronous or asynchronous communications could begin their literature review with the clusters above. Other cluster groups found in Figure 18 could be used by researchers in a similar manner to include the prominent citations found in this study.

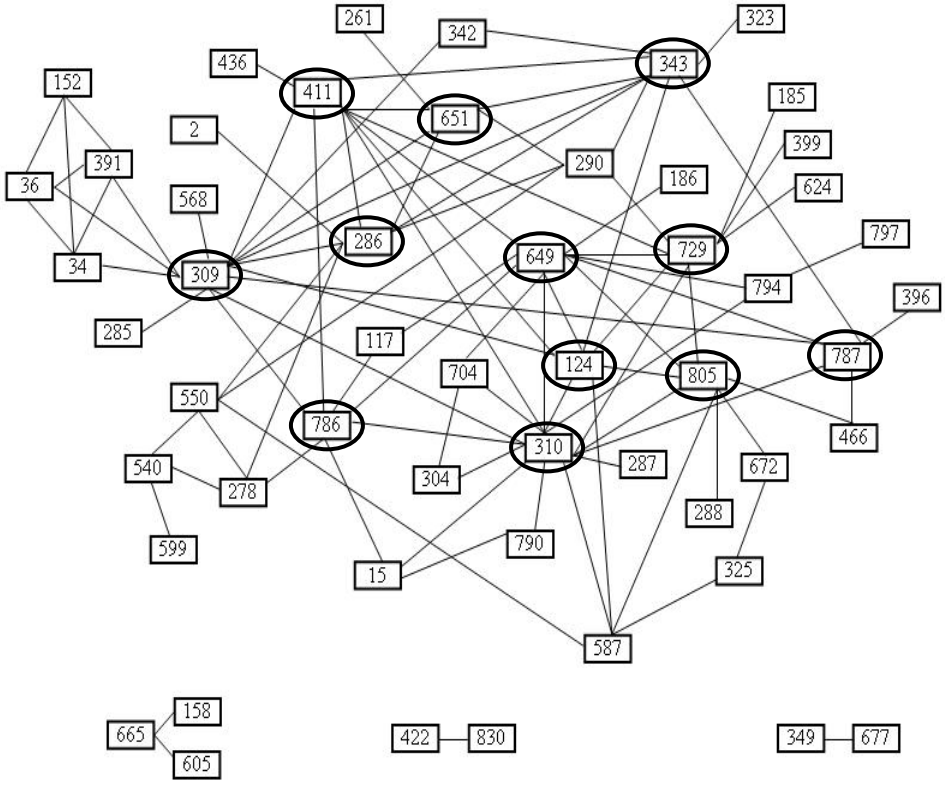


Figure 18. Co-citation cluster map: major co-citation clusters

Recommendations

Recommendations for application and further research are the result of the content analysis and bibliometric methods utilized in this study. Applications are literature recommendations for researchers who study the field of distance education.

Application

Researchers should be familiar with the leading authors in the field of distance education. These leading authors have developed and continue to advance theory and research in distance education. Their works are considered by scholars within the field of distance education as the key foundational studies upon which future research should be built upon. The works of Moore, Garrison, Rourke, Gunawardena, and Jonassen are foundational to the study of distance education. A number of journal articles, books, and book chapters are the literature pieces that researchers may put together to establish the theoretical or conceptual framework for continued research in this field. The tables supporting the bibliometric research questions found in Chapter IV contain valuable information generated by the analysis of the 278 journal articles that constituted this study's literature sample. The cluster maps of co-citations also provided important knowledge of the foundational citations as reflected in the reference lists of the four leading distance education journals (see Figure 14 and Figure 15). The authors, journals, books, bibliographic coupling relationships, and co-citation relationships identified in the Chapter IV tables create the map of the recent literature in distance education and provide the framework for researcher to address the research gaps identified by the IHEP (1999)

and Moore (2003a). An analysis of this study's data would continue to support the work of the IHEP (1999) and the three main questions which guided their research:

1. What does the original research say about the effectiveness of distance learning?
2. What are the key shortcomings of the research?
3. What are the gaps in the research that require further investigation and information?

Future Research

Interaction, collaborative learning, critical thinking, and multiple evaluation methods have been established as important benchmark components for quality in distance education. However, more qualitative and quantitative research is needed to validate the IHEP (2000) benchmarks and the new benchmarks identified by this study. The benchmarks as guidelines for quality in distance education should be evaluated for their effect on actual distance education programs. For example, there were numerous studies found in the 278 articles that analyzed the student and faculty discussions from asynchronous online threaded discussions. Researchers used a number of methods to conduct word counts, categorize discussions, and statistically analyze the results. However, few studies researched the learning effect asynchronous communications had on student achievement or whether the quality of interactions was improved. Additionally, the surveys and interviews conducted in the 2000 IHEP study could be replicated with a new sample of institutions to determine if the same results for presence and importance of the benchmarks would be found.

The rubric for interaction developed by Roblyer and Wiencke (2003) should be expanded to the other IHEP benchmarks. The benchmarks are guidelines for quality in distance education, but do not determine the degree of quality or measure the magnitude of quality for the benchmark. Citing Thompson and Irele (2003) in Chapter I, "It is important to realize that, without referents, the terms *quality* and *effectiveness* are meaningless" (p. 571). Roblyer's and Wiencke's rubric (see Table 1) provides distance educators a method for assigning a numerical indicator for low, moderate, and high interactivity. Future research could develop rubrics for other benchmarks which would provide the criteria for quality. For example, rubrics could be developed with specific criteria for evaluating the benchmarks that are guidelines for periodically reviewing instructional materials and learning outcomes.

Nineteen of the final 24 IHEP benchmarks had a low citation frequency of being found in the research literature. Interviews and surveys with students, faculty, and administrators should be conducted to continue the work of the 1999 and 2000 IHEP reports. The results of the interviews and surveys may validate the final IHEP benchmarks and identify the components critical in planning and delivering high quality distance education programs. New methods for enhancing interaction and online pedagogy must be developed and evaluated. An online course or distance education program cohort may consist of students not only from across the United States but also from international venues. The global nature of distance education challenges interaction among students who could be living in different time zones and creates course design decisions that must take into account potential cultural differences that may require new pedagogy and protocols.

The new benchmarks found in this study for pre-orientation and expanding learner-content interaction are worthy of further study and should include an assessment of their effect on students' success and persistence in distance education. Finally, research is needed to understand and further define the systems model as applied to distance education (see Figure 3). A comparison of the relationships between the 2000 IHEP benchmarks and the findings from this study's content analysis of the 278 citing journal articles could provide an indication as to systems relationships found in the recent literature. Research to assess the relationships among the seven benchmark categories could answer why the gaps identified by the 1999 IHEP study appeared:

1. The research has tended to emphasize student outcomes for individual courses rather than for a total academic program.
2. The research does not take into account differences among students.
3. The research does not adequately explain the high drop-out rates of distance learners are higher.
4. The research does not take into consideration how the different learning styles of students relate to the use of particular technologies.
5. The research focuses mainly on the impact of individual technologies rather than on the interaction of multiple technologies.
6. The research does not include a theoretical or conceptual framework.
7. The research does not adequately address the effectiveness of digital libraries.

The seven gaps identified by the IHEP in 1999 may still be true today. There could be additional gaps in the literature that require further research. The frequency of IHEP benchmarks found in the research literature (see Table 8) identified only seven

benchmarks that were cited in more than 20 percent of this study's sample of 278 journal articles. The remaining 38 benchmarks were cited in less than 20 percent of the 278 journal articles and could indicate the need for further research. This study has evaluated the recent literature in distance education and the presence of the IHEP benchmarks in the recent literature. The results of the content analysis and bibliometric methods for the 278 journal articles frame the existing literature by identifying the leading authors, publications, and mapping the citations. This knowledge provides researchers a valuable tool to extend the existing research and address the gaps identified by the 1999 IHEP report.

Epilogue

What is important and effective today in distance education will continually change and evolve as technology and telecommunications make rapid advances. Faculty and administrators continually find themselves with new challenges to improve the quality of distance education as technology evolves. Repeating Novak's (2002) quote from Chapter I has merit, "…that distance education is an evolving medium and that what we are calling distance education today will probably be unrecognizable ten years from now" (p. 80). Who would have thought that MySpace (www.myspace.com) and YouTube (www.youtube.com) would become a major tool to facilitate student/student and faculty/student interaction? Science professors at a large Midwestern university are posting assignments and course materials on these two websites to support their students. The shelf-life of knowledge claims can be short-lived in the field of distance education.

A major learning experience took place on the part of the researcher during this study. There was a desire to move beyond the standard keyword and reference list searches normally conducted by doctoral students in preparing their dissertations.

> The point is not to track down every paper that is somehow related to the topic. Research synthesists who reject this idea are quite sensible. The point is to *avoid missing a useful paper that lies outside of one's regular purview*, thereby ensuring that one's habitual channels of communication will not bias the results of studies obtained by the search. (White, 1994, p. 44)

The work of Beile, Boote, and Killingsworth (2004) became an inspiration for this researcher. After attending a session Beile conducted at the 2005 American Education Research Association conference, this authored was honored to have an opportunity to discuss her research and the use of citation analysis during the conference. My fascination with bibliometrics continued to grow after meeting with a dissertation committee member who opened to me the electronic search capabilities found in online databases and other digital library services. My total immersion in bibliometrics occurred shortly after researching and answering a doctoral qualification exam question that pertained to bibliometrics. The importance of the literature review and analysis of the literature beyond the Chapter II review became the central focus for this researcher. Quality research is grounded in previous research found in the literature. The importance of the existing body of literature was continually reiterated by my statistics professor who always told us to refer to the literature in our particular field to find answers to various theoretical or conceptual questions we asked during class. The importance of grounding

research in the literature was paramount, if one adheres to the philosophy that developing and emerging theory must be based on past research.

How do we judge the value of past research? The peer review process supposedly provides some reliability factor that published studies have met the rigor of the scholarly review process established by the publisher. However, the Internet and other online resources are challenging the trustworthiness of information. Anyone, anywhere, at anytime can publish and make it appear the article has value and is based on expert opinion. The need to continue research based on valid and reliable past research was a guiding principle for this study.

Content analysis of the literature sample provided valuable information for the presence of the 2000 IHEP benchmarks. Although reading each article in its entirety and coding the content for IHEP benchmarks was time consuming, the effort provided rich data to analyze and provide for comparison to the 2000 IHEP study. Content analysis has great value in analyzing publications or other communications when the coding scheme is based on a construct or framework found in the literature. This study used the 2000 IHEP benchmarks as the framework for the coding scheme.

The application of bibliometric methods was a valuable learning experience for this study's author. The author originally intended to use information available through the Social Sciences Citation Index via the Web of Science through the ISI Web of Knowledge. However, the four journals which constituted this study's literature sample are not part of the Social Sciences Citation Index. Therefore, this researcher created Microsoft Access database programs and Microsoft Excel spreadsheets to provide the data required to conduct co-citation analysis and bibliographic coupling. Databases and

spreadsheets are simple to construct and have tools that simplify the calculations to find co-citation and bibliographic coupling relationships. This study's sample of 278 journal articles and 7,754 citations required considerable time for data input and analysis (over 1,000 hours); however, the procedure could be applied to other studies with a smaller scale literature sample and provide valuable information and results. The cluster map enhances the co-citation analysis data to graphically display the important connections among the research literature.

Methodology was as important to this study's author as the quest to make claims of new knowledge. Content analysis of the literature uncovered what the selected journal articles were communicating to the scholarly community in the context of the 2000 IHEP benchmarks. The bibliometric methods highlighted which authors, publications, citations, and bibliographic relationships defined the field of distance education. Identifying the leading authors, publications, and citation relationships that existed within the leading four journals from 2002 through 2006 provided new knowledge to researchers and practitioners. This new knowledge will help researchers avoid the exhaustive searches cautioned by White (1994) and identify the cornerstone research found in the recent distance education literature.

Concluding Comments

The primary purpose of this study was to determine what 2000 IHEP benchmarks were found in the recent distance education literature for the time period 2002 through 2006. A secondary purpose of this study was to identify the publications, authors, patterns, and relationships among those publications and their citations that contributed to

the current body of research in distance education. The general research question guiding this study was:

> To what extent have the IHEP benchmarks from 2000 guided recent distance education research, what relationships among the research publications bibliometric methods identify, and how did the results improve distance education research?

Content analysis and bibliometric methods were chosen to collect data and analyze the recent literature in distance education. The findings from analyzing the 278 journal articles from *The American Journal of Distance Education*, *Journal of Distance Education*, *Distance Education*, and *Open Learning* and the 7,754 citations found in the reference lists of the 278 articles should inform future researchers of the foundational publications, leading authors, and bibliometric relationships. The essential need for having knowledge of the existing literature was stated in the citation by Moore (2003a) found in Chapter I of this study:

> Just as it is hard to imagine that in any other field of inquiry researchers could set out to gather data without full knowledge of what research had previously been undertaken, so it is hard to imagine other professionals would build programs, train teachers, invest millions of dollars, make appearances before Congressional committees, and soon, without a substantial review of previous practice in their field---without a review of what had succeeded and what had failed and the reasons for the successes and failures. Yet in distance education, it happens all the time. (p. xi)

The researcher hopes the findings of this study will provide researchers an increased knowledge and answers of the recent research literature that has been undertaken.

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APPENDIX A

INITIAL 45 IHEP BENCHMARKS BY CATEGORY

Benchmark	Essential
Category: Institutional Support	
1. Faculty are provided professional incentives for innovative practices to encourage development of distance learning courses.	no
2. There are institutional rewards for the effective teaching of distance learning courses.	no
3. A documented technology plan is in place to ensure quality standards.	yes
4. Electronic security measures are in place to ensure the integrity and validity of information.	yes
5. Support for building and maintaining the distance education infrastructure is addressed by a centralized system.	yes
Category: Course Development	
6. Distance learning course development must be approved through a broad peer review process.	no
7. Guidelines exist regarding minimum standards for course development, design, and delivery.	yes
8. Course design is managed by teams comprised of faculty, content experts, instructional designers, technical experts, and evaluation personnel.	no
9. During course development, the various learning styles of students are considered.	no
10. Assessment instruments are used to ascertain the specific learning styles of students, which then determine the type of course delivery.	no
11. Courses are designed with a consistent structure, easily discernable to students of varying learning styles.	no
12. The technology being used to deliver course content is based on learning outcomes.	yes
13. Instructional materials are reviewed periodically to ensure they meet program standards.	yes
Category: Teaching/Learning Process	
14. Student interaction with faculty is facilitated through a variety of ways.	yes
15. Student interaction with other students is facilitated through a variety of ways.	yes
16. Feedback to student assignments and questions is provided in a timely manner.	yes

17. Feedback to students is provided in a manner that is constructive and non-threatening.	yes
18. Courses are separated into self-contained segments (modules) that can be used to assess student mastery before moving forward in the course or program.	no
19. The modules/segments are of varying lengths determined by the complexity of learning outcomes.	no
20. Each module/segment requires students to engage themselves in analysis, synthesis, and evaluation as part of their course assignments.	yes
21. Class voice-mail and/or e-mail systems are provided to encourage students to work with each other and their instructor.	yes
22. Course are designed to require students to work in groups utilizing problem-solving activities in order to develop topic understanding.	no
23. Course materials promote collaboration among students.	no
Category: Course structure	
24. Students are provided with supplemental course information that outlines course objectives, concepts, and ideas.	yes
25. Specific expectations are set for students with respect to a minimum amount of time per week for study and homework assignments.	no
26. Faculty are required to grade and return all assignments within a certain time period.	no
27. Sufficient library resources are made available to the students.	yes
28. Students are instructed in the proper methods of effective research, including assessment of resource validity.	yes
29. Before starting a program, students are advised about the program to determine if they have the self-motivation and commitment to learn at a distance.	yes
30. Learning outcomes for each course are summarized in a clearly written, straightforward statement.	yes
Category: Student Support	
31. Students can obtain assistance to help them use electronically accessed data successfully.	yes
32. Students are provided with hands-on training and information to aid them in securing material through electronic databases, interlibrary loans, government archives, new services, etc.	yes
33. Written information is supplied to the student about the program.	yes
34. Easily accessible technical assistance is available to all students throughout the duration of the course/program.	yes
35. A structured system is in place to address student complaints.	yes
Category: Faculty Support	
36. Technical assistance in course development is available to faculty and they are encouraged to use it.	yes
37. Faculty members are assisted in the transition from classroom teaching to distance instruction and are assessed in the process.	yes
38. There are peer mentoring resources available to faculty members teaching distance courses.	yes

39. Distance instructor training continues throughout the progression of the online course.	yes
40. Faculty members are provided with written resources to deal with issues arising from student use of electronically-accessed data.	yes
Category: Evaluation and Assessment	
41. The program's educational effectiveness is measured using several methods.	yes
42. An evaluation process is used to improve the teaching/learning process.	yes
43. Specific standards are in place to compare and improve learning outcomes.	yes
44. Data on enrollment, costs, and successful/innovative uses of technology are used to evaluate program effectiveness.	yes
45. Intended learning outcomes are regularly reviewed to ensure clarity, utility, and appropriateness.	yes

APPENDIX B

FINAL 24 IHEP BENCHMARKS BY CATEGORY

Category: Institutional Support
1. A documented technology plan that includes security measures (i.e. password protection, encryption, back-up systems) is in place and operational to ensure both quality standards and the integrity and validity of information.
2. The reliability of the technology delivery system is a failsafe as possible.
3. A centralized system provides support for building and maintaining the distance education infrastructure.
Category: Course Development
4. Guidelines regarding minimum standards are used for course development, design, and delivery, while learning outcomes – not the availability of existing technology – determine the technology being used to deliver course content.
5. Instructional materials are reviewed periodically to ensure they meet program standards.
6. Courses are designed to require students to engage themselves in analysis, synthesis, and evaluation as part of their course and program requirements.
Category: Teaching/Learning
7. Student interaction with faculty and other students is an essential characteristic and is facilitated through a variety of ways, including voice-mail and/or email.
8. Feedback to student assignments and questions is constructive and provided in a timely manner.
9. Students are instructed in the proper methods of effective research, including the assessment of the validity of resources.
Category: Course Structure
10. Before starting an online program, students are advised about the program to determine (1) if they possess the self-motivation and commitment to learn at a distance and (2) if they have access to the minimal technology required by the course design.
11. Students are provided with supplemental course information that outlines course objectives, concepts, and ideas, and learning outcomes for each course are summarized in a clearly written, straightforward statement.
12. Students have access to sufficient library resources that may include a “virtual library” accessible through the World Wide Web.
13. Faculty and students agree upon expectations regarding times for student assignment completion and faculty response.

Category: Student Support
14. Students receive information about programs, including admission requirements, tuition and fees, books and supplies, technical and proctoring requirements, and student support services.
15. Students are provided with hands-on training and information to aid them in securing material through electronic databases, interlibrary loans, government archives, news services, and other sources.
16. Throughout the duration of the course/program, students have access to technical assistance, including detailed instructions regarding the electronic media used, practice sessions prior to the beginning of the course, and convenient access to technical support staff.
17. Questions directed to student service personnel are answered accurately and quickly, with a structured system in place to address student complaints.
Category: Faculty Support
18. Technical assistance in course development is available to faculty, who are encouraged to use it.
19. Faculty members are assisted in the transition from classroom teaching to online instruction and are assessed during the process.
20. Instructor training and assistance, including peer mentoring, continues through the progression of the online course.
21. Faculty members are provided with written resources to deal with issues arising from student use of electronically-accessed data.
Category: Evaluation and Assessment
22. The program's educational effectiveness and teaching/learning process is assessed through an evaluation process that uses several methods and applies specific standards.
23. Data on enrollment, costs, and successful/innovative uses of technology are used to evaluate program effectiveness.
24. Intended learning outcomes are reviewed regularly to ensure clarity, utility, and appropriateness.

APPENDIX C

CITING DOCUMENT TRACKING NUMBERS

Tracking Number	Citing Document
5	Dupin-Bryant, P. A. (2004). Pre-entry variables related to retention in online distance education. The *American Journal of Distance Education, 18(4)*, 199-206.
8	Choi, H. J., & Johnson, S. D. (2005). The effect of context-based video instruction on learning and motivation in online courses. *The American Journal of Distance Education, 19(4)*, 215-227.
10	Yang, Y. C., Newby, T. J., & Bill, R. L. (2005). Using Socratic questioning to promote critical thinking skills through asynchronous discussion forums in distance learning environments. *The American Journal of Distance Education, 19(3)*, 163-181.
14	Stein, D. S., Wanstreet, C. E., Calvin, J., Overtoom, C., & Wheaton, J. E. (2005). Bridging the transactional gap in online learning environments. *The American Journal of Distance Education, 19(2)*, 105-118
15	Fahy, P. J., & Ally, M. (2005). Student learning style and asynchronous computer-mediated conferencing (CMC) interaction. *The American Journal of Distance Education, 19(1)*, 5-22.
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APPENDIX D

CITATION TRACKING NUMBERS

Tracking Number	Citation
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VITA

Upton Ralph Shimp

Candidate for the Degree of

Doctor of Philosophy

Thesis: EVALUATION OF THE DISTANCE EDUCATION LITERATURE: A CONTENT ANALYSIS USING THE INSTITUTE FOR HIGHER EDUCATION POLICY BENCHMARKS AND SELECTED BIBLIOMETRIC METHODS

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Professional Memberships: American Educational Research Association; Phi Kappa Phi; International Association for Continuing Education and Training, Council on Standards Development; University Continuing Education Association; American Society for Training and Development.

Name: Upton Ralph Shimp Date of Degree: December, 2007

Institution: Oklahoma State University Location: Stillwater, Oklahoma

Title of Study: EVALUATION OF THE DISTANCE EDUCATION LITERATURE: A CONTENT ANALYSIS USING THE INSTITUTE FOR HIGHER EDUCATION POLICY BENCHMARKS AND SELECTED BIBLIOMETRIC METHODS

Pages in Study: 198 Candidate for the Degree of Doctor of Philosophy

Major Field: Education

Scope and Method of Study: The primary purpose of this study was to determine what 2000 IHEP benchmarks were found in the recent distance education. A secondary purpose of this study was to identify the publications, authors, patterns, and relationships among those publications that contributed to the current body of research in distance education. The literature sample consisted of 278 journal articles from *The American Journal of Distance Education*, *Journal of Distance Education*, *Distance Education*, and *Open Learning* for the time period 2002 through 2006. The reference lists of the 278 journal articles contained a total of 7,754 citations. First, a content analysis identified the IHEP benchmarks that were found in the recent distance education literature. Second, bibliometric methods were used to analyze the patterns and relationships existing in the distance education literature among the associated bibliographic data.

Findings and Conclusions: The content analysis found three benchmarks which accounted for over 32 percent of the benchmarks found in the 278 journal articles. The top three benchmarks were (1) student/faculty interaction, (2) student/student interaction, and (3) communication collaboration. Pre-orientation to the distance education course and learner interaction with content were the two most frequently found new benchmarks in the literature sample. Moore was the most cited author and also had the most cited journal article and book. *The American Journal of Distance Education*, *Journal of Distance Education*, *Distance Education*, and *Open Learning* were also the most cited journal publications. Quantitative and descriptive accounted for 61 percent of the research methodologies utilized in the 278 journal article studies. Co-citation analysis created a cluster map displaying the literature connections between the most cited research in distance education. Overall results indicated that interaction is the most important quality factor in distance education. Future research could develop rubrics for quality benchmarks which would provide the criteria for evaluating quality in distance education. Expanded use of bibliometric methods could further develop the theoretical framework for research in distance education.

ADVISER'S APPROVAL: _____